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Report of the Chief of the Forest Service, 1956

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UNITED STATES DEPARTMENT OF AGRICULTURE,
FOREST SERVICE,
Washington, D. C., October 1, 1957.

Hon. EZRA TAFT BENSON,
Secretary of Agriculture.

DEAR MR. SECRETARY:

My 1956 Annual Report is submitted for your attention. It highlights the progress made during this 51st year of the Forest Service and points up some opportunities for the future.

The past year's activity was marked by a number of new records for which I feel the entire organization may be justly proud. In reporting these accomplishments, I express appreciation for the fine support which your office, the Budget Bureau, and the Congress have given the Forest Service to make this progress possible.

Increased appropriations for timber sales and access roads resulted in an unprecedented cut of 6.9 billion board-feet. Receipts for timber sold totaled $107,073,158, a gain of 46 percent over the previous high. Total receipts from all national-forest and land utilization project activities were $118,517,321. Improvements were also made in other resource fields where additional funds had been provided. We believe these results justify the support given the Forest Service in these matters.

Public use of national forests for recreation, including hunting and fishing, was greater than ever. Recognizing this trend, we are preparing a plan to meet present needs and future requirements.

Looking also to the future was a comprehensive study of America's present timber situation, requirements in the years ahead, and ability to meet them. A preliminary draft of this study, "The Timber Resource Review," was released and received wide attention. Suggestions and comments from this review are being analyzed for preparation of the final report.

Creditable advances were made in several research fields to develop better ways of expanding wood production, and the utilization and protection of the Nation's forest resources. For example, a new cold soda pulping process using hardwoods was moved from the laboratory to actual application. Aerial tankers, developed by researchers and fire technicians, joined the fire fighting team. Longleaf pine was successfully seeded by aircraft, following extensive research effort.

Additional private landowners were given forest protection and management help through cooperation with State forestry agencies. Tree seedling production and planting reached a new high, and number of forest fires reached a new low.

Encouraging as these developments may be, we still face many tasks which challenge our best efforts. Farm woodland and other small private forests hold the key to this Nation's future timber supply. These lands, now generally in poor condition, are the greatest potential source of wood fiber. Producing more wood on these lands requires concerted effort by State and Federal foresters, forest industries, and the landowners.

We need to intensify multiple-use management on the national forests; watershed and range improvement must be accelerated; losses from insects and diseases have to be reduced; and greater knowledge of fire behavior must be obtained to lessen catastrophic forest fires.

The men and women of the Forest Service take pride in their accomplishments. This pride nevertheless is tempered by full awareness of the many opportunities ahead to make forest resources better serve the American people, now and in the future.

Sincerely yours,

Richard E. McArdle

RICHARD E. MCARDLE
Chief, Forest Service

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This Report Covers Calendar Year Activities Unless Otherwise Identified. Where Records are on a Fiscal Year Basis, They are so Reported

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Report of the Chief of the Forest Service, 1956

Having passed the milestone of its first 50 years, the Forest Service in 1956 recognized a decided growth of interest throughout the Nation in national-forest resources and in programs and activities of the organization.

The 1956 cut of timber from national forests reached an unprecedented high of 6.9 billion board-feet, an increase of 10 percent over the 1955 record cut; 29,288 new timber sale contracts were made; the alltime high of 52.5 million recreation visits to the national forests, of which almost 14 million were by hunters and fishermen, surpassed predicted use by over 3 million.

Permits were issued to 19,858 livestock owners to graze 1.1 million cattle and horses and 2.7 million sheep plus their offspring under 6 months of age; 94,000 acres of rangeland were improved through seeding; 56,000 special land use permits were administered for resorts, telephone lines, water developments, summer homes, and other purposes consistent with the broad principles of national-forest administration; planting and seeding to trees was accomplished on 61,000 acres; 905 miles of roads, 177 miles of trails, and 66 new bridges were constructed, of which 678 miles of roads and 61 bridges provide access to timber stands; 190,000 miles of existing roads and trails were maintained; 12,466 fires were controlled on or adjacent to national forests; rehabilitation was accomplished on 30 watershed areas in 28 national forests. More than 7 million acres of land utilization project lands in 28 States and Puerto Rico were administered, in addition to almost 181 million acres of national-forest land.

In its work with States and private owners, the Forest Service cooperated in protecting 390 million acres of non-Federal forest land from fire, an increase of 2.7 million acres over 1955; cooperated with 41 States (an increase of 3) in providing technical forest management assistance to 38,121 farmers and other small woodland owners; assisted 6,405 sawmill operators and other forest products processors; cooperated with 44 States, Hawaii, and Puerto Rico in producing 560 million trees. To supply stock needed under title 1 of the Agricultural Act of 1956 (Conservation Reserve), nursery capacity was almost doubled and plans were made for providing cooperative technical tree planting assistance.

The Forest Service participated with the Soil Conservation Service and States in (1) developing work plans for flood prevention on 100 watersheds, (2) planting 4,000 acres of sediment-source areas to trees, (3) constructing 500 acres of terrace, and (4) developing woodland management plans for 32,700 acres. Under cooperative emergency flood prevention programs, 68,400 acres of burned watershed land was seeded.

Through the forest pest control program on national-forest land, 818 million board-feet of dead, down, insect-infested, and susceptible timber was harvested by commercial timber sales; 304,792 bark beetle-infested trees were treated; and 1,366,900 acres of Douglas-fir timber on national-forest and other Federal land were treated for control of spruce budworm. To confine the spread of white pine blister rust, 13½ million ribes were eradicated from 722,351 acres of Federal, State, and private land.

A few of the significant contributions made by Forest Service research in 1956 were appraisal of the Great Plains shelterbelt plantings and development of methods for (1) successful aerial seeding of longleaf pine, (2) predicting soil moisture, (3) effective and profitable rest-rotation system for grazing mountain ranges, (4) seeding to improve big-game range, (5) direct and effective aircraft support of ground fire fighting crews, (6) anticipating behavior of large fires, (7) preventing termite damage through chemical treatment of building insulation material, (8) new uses for low-grade hardwoods, and (9) improving processes for increasing pulp yields.

During the 1956 session of Congress, the Forest Service followed on a day-to-day basis 538 bills that would have affected Forest Service activities. This excluded appropriations, general personnel, property, or other bills affecting the executive agencies generally. Of the 538, 24 were enacted, an unusually large number for one session. Among the new statutory provisions were: (1) Authority to purchase additional land within the Roadless Area, Superior National Forest, Minn.; (2) release of a portion of the receipts from the Tongass National Forest, Alaska, held in escrow—25 percent to the Territory and 10 percent for national-forest road and trail work in Alaska national forests; (3) broadened authority for the issuance of long-term permits for use of national-forest lands; (4) approval of the Middle Atlantic Interstate Forest Fire Protection Compact; (5) permanent authority to advance funds to Forest Service cooperators in forest, range, and watershed management research; (6) new authority for reforestation in cooperation with States; and (7) establishment of a Forest Service working capital fund.

Widespread interest in recreational use prob-

lems of the national forests and other Federal lands led to the introduction in Congress of numerous bills aimed at solving these problems. The Senate Appropriations Committee requested the Forest Service to initiate a long-range program for the improvement of public recreation areas in the national forests. This study was completed, and preparation of a report was started in 1956.

Future demands for the products and services provided by forest and range lands are directly related to the number and economic condition of the Nation's people. Preliminary results of the Timber Resource Review, announced in 1955, showed that projected increases in population and gross national product would create greater demands for timber. By the year 2000 growth of sawtimber would need to be from 70 percent to 120 percent above the growth of 1952. Increased demands for other products and services can also be expected. The Forest Service has looked ahead to the end of this century and estimated the proportionate share of total demands for renewable natural resources and for services that the national forests should be expected to produce at that time.

The allowable cut of timber from national-forest lands in the year 2000 should be 24 billion board-feet of sawtimber and other timber products, an increase of 250 percent over the actual cut of 6.9 billion board-feet in 1956. Recreational use of the national forests is expected to increase from 52½ million visits in 1956 to 170 million visits by 2000, an increase of 225 percent. Wildlife habitats will be expected to provide fish and game for at least twice the 14 million hunting and fishing visits made on national forests in 1956.

Total national requirements for water may increase four times by the year 2000. In the Western States, national forests comprising 21 percent of major river basin areas yield 53 percent of the total runoff. With water supplies in the West already becoming a limiting factor in development, the national-forest share of water production cannot be less than the optimum.

Projected demands for meat indicate that by 1975 production in live weight of cattle and calves and of sheep and lambs will need to increase 50 percent and 25 percent, respectively, over 1951–53 levels. Population growths after 1975 may result in equally great increases in demand for meat during the last 25 years of this century. National forests in Western States provide about 7 percent of the total feed requirements of western livestock, and summer ranges hold a key position in the yearlong operations of many producers. If the national forests are to continue to contribute to feed requirements, productivity of national-forest ranges must be increased through seeding, control of noxious plants, and management of usable range.

These increased demands indicate desirable objectives for management of the national forests during the next 44 years. Long-range planning will be necessary. Reaching the objectives under policies of sustained yield and multiple use will be a greater task than heretofore envisioned.

The three major fields of Forest Service responsibility are reported here: Management of the national forests, cooperation with States and private industry, and research. In addition, administrative management and fiscal control are reviewed, and statistical tables are given.

MANAGEMENT OF THE NATIONAL FORESTS

The 149 national forests are located in 38 States, Puerto Rico, and Alaska. These public forests, containing 181 million acres, serve the needs of individuals, families, communities, business, industry, States, and the Nation as a whole. The needs, desires, and uses vary by localities; they may be single purpose, or they may overlap or conflict. With expanding populations and resulting increased needs and desires of the American people for forest resources, it is becoming more important not only for the Forest Service to practice scientific multiple-use management, but for the people to understand the term and its objectives.

Under multiple-use management and in line iwth good conservation practices, national-forest resources are managed to provide the highest public benefit—for the greatest good of the greatest number in the long run. Although several uses can be managed simultaneously in the same area over most national-forest land, coordination of the diverse uses can be achieved only by making each resource serve its best purpose, considering its perpetuation and its place in the correlated use of all the resources.

Managing the national forests includes protecting the resources from fire, insects, and disease; improving and developing the resources to meet the present needs of 170 million Americans; and planning long-range programs to make the resources serve succeeding generations.

For administrative purposes, the national forests are divided into 10 regions; a Regional Forester is in charge of each, with an Assistant Regional Forester looking after each resource and management division. There are 770 ranger districts, averaging 235,000 acres each, supervised by a District Ranger who is the key individual responsible for protecting, managing, and developing the resources of his district. A national forest, under the direction of a Forest Supervisor, includes from 3 to 10 ranger districts.

In this section the various resources—water, timber, recreation, wildlife, forage, wilderness, and mining—are discussed, along with other aspects of the overall management of the national forests.

Watershed Management—An Essential Resource Job

Usable water is one of the most valuable crops supplied by national forests. Especially in the West many communities depend upon national-forest watersheds for all or a large part of their water.

Logging, grazing of wildlife and domestic livestock, the effects of fire, insects, and disease, and the construction of roads and trails can affect the ability of a watershed to supply usable water. Watershed management is directly related to all resource use, and management planning for any resource must take into consideration the importance of water.

Servicewide Watershed Conference

The most comprehensive Servicewide watershed management conference to date was held for representatives of all organization levels of the Forest Service. Watershed management objectives and policies, as well as in-Service coordination in planning and carrying out functional activities, training, aspects of interagency cooperation, soil-vegetation surveys, and need for acceleration of the watershed management program were given special attention.

Watershed Rehabilitation

Watershed rehabilitation was stepped up in 9 of the 10 regions. Work done on 30 watershed areas in 28 national forests included measures to check erosion, to stop surface runoff of water, and to establish vegetative cover for stability and better hydrologic conditions. Rehabilitation work was coordinated with range and timber management and with engineering activities, to accomplish an integrated program of resource protection and development.

Examples of community interest and cooperation in watershed rehabilitation are the towns of Narrows and Marion, Va., and Blanding, Utah. In all three instances, communities felt something had to be done to correct watershed conditions such as erosion on old logging roads, skid trails, mining excavations, and overgrazed areas. Local people participated in planning the projects on national-forest land and made contributions of cash and labor. Another example is the contour trenching and seeding done in upper Meadow Creek watershed on the Fishlake National Forest in Utah; this treatment will restore hydrologic relationships and reduce flood damages downstream by an estimated 80 percent.

Effects of Strip Mining

An example of interagency cooperation is the watershed study initiated on the Cumberland National Forest in Kentucky, to evaluate the effects of strip mining of coal on streamflow, water quality, sedimentation, channel stability, and fish life. Gages necessary to collect data have been installed and are in operation. Six agencies of the State of Kentucky joined the U. S. Geological Survey, Corps of Engineers, Soil Conservation Service, and the Fish and Wildlife Service in cooperating with the Forest Service.

Soil Surveys

Soil survey work is progressing on national forests in several regions. The surveys provide information on erosion hazards and data for planning and installing watershed protection structures; on how to apply soil stabilization measures on different kinds of soil; and on measures needed for stabilizing soil in connection with road construction and resource management activities.

Peak Streamflow Study

In a study on national-forest areas in the Northern Rocky Mountain Region, peak flows of streams are being measured and their effects on water impoundment structures are being evaluated. Results of this study will determine the size of culverts and bridges and thus help in designing road and trail systems.

The Timber Management Job

The national forests, which include one-sixth of the commercial forest land in the United States, have 765 billion board-feet of sawtimber. In 1956 almost 7 billion board-feet of timber were harvested from these stands, an increase of more than 34 percent since 1953, when 5.2 billion board-feet were cut.

Receipts for timber in 1956 totaled $107,073,158, an increase of 46 percent over 1955 and a 50 percent increase in income from sale of national-forest timber since 1953.

The increased harvest of timber from national forests has had a favorable economic effect. In addition to the return of 25 percent of national-forest receipts to States, for distribution to counties containing national-forest land, communities and business directly and indirectly related to the timber crop are benefited. Segments of the economy all the way from logging in the woods to wood-processing plants in town are affected.

The allowable annual cut figure for each national forest is based on the most recent inventory and growth information and on current standards of utilization employed by the timber industry in the locality. For example, the allowable cut is higher on a unit where there is a demand for both saw logs and pulpwood than on one where only saw logs can be utilized. At present the allowable cut, under good forestry practices, is slightly more than 9 billion board-feet. This figure has risen as modern inventory methods and research on utilization of wood have made it possible to sell some species and qualities of timber not considered marketable heretofore.

Access roads are making additional stands available for cutting although roads are still needed to open up many other areas where marketable timber could be cut. Improved utilization by the timber industry, through marketing greater percentages of timber cut, is reflected in the allowable cut figure. Additional markets should be developed in some places for forest products that are not now readily marketable. Forest research is helping on this. Lack of adequate personnel to prepare for and administer timber sales is still a problem.

Status of Timber Access Roads

Progress was made in timber access road construction in 1956. The Forest Service built or rebuilt 678 miles of roads and built 61 new bridges for this purpose and plans to build 965 miles in 1957. When appraisals are made to determine the price at which timber will be offered for sale, consideration is given to the cost of roads to be built by purchasers of timber. Under this plan of stumpage price adjustment, purchasers of national-forest timber built 2,144 miles of access road needed in their operations in 1956 and plan to build 3,500 miles in 1957.

Around 50,000 of the 124,000 miles of roads in the national-forest system provide access to timber stands, and in addition many general purpose roads serve to increase the harvest of timber.

Timber Inventory and Management Plans

Timber is being inventoried in every national-forest region. Some regions are nearing completion of their work now, with the entire program estimated to be finished within 5 years. This will be the first complete coverage of all national forests with a planned, scientific inventory of the timber resources. These modern inventories, based on aerial photographs and scientific sampling methods, will be used to make up-to-date timber management plans for each of the 500 working circles in the national-forest system.

Information from the original inventory in Arizona, which was largely on a sawtimber basis, was re-examined to determine how much thinning could be done in young ponderosa pine stands through harvesting for pulpwood. As a result of the findings, preparatory sale work was completed. This will mean the first large-sale offering based on thinning young stands of ponderosa pine for pulp.

Lodgepole pine has never been in great demand in Oregon and has not been harvested for pulp in that area. As a result of timber resource inventory work, a sizable pulp offering of lodgepole pine was developed in the Klamath Falls, Oreg., area. An eastern company has shown an interest in securing Oregon lodgepole pine for pulp. Sale of this timber will result in harvest of a heretofore little-used resource.

Increased Interest in National-Forest Timber

Timber sales increased in number from 27,542 in 1955 to 29,288 in 1956, with 19,726 of them for $2,000 worth of timber or less. Timber cut on national forests in the United States, Puerto Rico, and Alaska reached 6.9 billion board-feet in 1956.

Interest in Alaska's timber stands continued to mount. Two major timber sales were awarded there during the year. A preliminary award was made for about 5.25 billion board-feet of pulp timber in the vicinity of Sitka. A dissolving pulp plant of about 300-ton daily capacity will be located near Sitka, where the plant site has been selected. Studies have been conducted to control pollution. In this, as in all timber sales, the sale contract provides for safeguarding spawning streams, wildlife habitat, and scenic and other resource values in the logging areas.

Another major sale in Alaska is for 7.5 billion board-feet of timber to be cut over the next 50 years. As a result of this contract, a pulp mill of at least a 500-ton daily capacity is planned for the Juneau area.

Salvage Operations

Sale and salvage of some 100 million board-feet of national-forest timber, killed by the Haystack fire on the Klamath National Forest in northern California in September 1955, is being accomplished. This will result in almost complete salvage of the mature fire-killed timber, which would be wasted if not harvested promptly. However, most of the fine crop of young timber was completely destroyed by the fire.

Reforestation and Stand Improvement

Data on reforestation and timber stand improvement for the fiscal year 1956 are summarized as follows:

	Acres
Planted and seeded	61, 171
Other regeneration	23, 556
Plantation release	23, 981
Natural stand release, weeding, and thinning	419, 155
Pruning and crop tree release	107, 229
Animal control (mostly fencing)	324, 796
Rodent control	83, 490
Disease control (except blister rust control)	38, 248
Other (mostly cull tree treatment)	149, 468

Planting stock produced at the 12 Forest Service nurseries was used as follows:

	Thousands
Held for national-forest planting	61, 698
Furnished to States and other Federal agencies	57, 819
Total	119, 517

Most of the nearly 62 million seedlings were used for planting 56,710 acres of national-forest land. The remainder were used for an additional

small acreage of experimental plantings and for test purposes. In addition, 4,461 acres were seeded or planted with stock obtained from other than Forest Service nurseries.

National-Forest Fire Control

The 1956 fire season was the worst on record in Arizona and New Mexico; Georgia and Florida also experienced bad fire conditions during the spring months. California had a severe and unusually long fire season, which extended into the fall and early winter. Actually less than 1 percent of the fires on national forests cause 80 percent of the damage. Reducing the number of large fires that get out of control and cause great damage and expense was one of the earliest objectives established for control of forest fires. One means of accomplishing this objective was an increased manning experiment started on 8 national forests in 4 regions. Results in the first year, with favorable reports from 6 of the 8 forests, indicate that stepped-up manning will pay its way. Number of man-caused fires and number of large fires were reduced by 35 percent. This is only one of many methods studied for improving techniques and effectiveness of fire control on the national forests.

Advances in Air and Ground Equipment Use

Smokejumpers were used in 5 regions for initial attack on 434 fires, and provided reinforcement on 36 for a total of 1,490 fire jumps. An estimated savings of 38,000 acres burned and $1,360,000 suppression cost was credited to the smokejumpers.

Other notable advances were made in aerial attacks, progress which is comparable to development of the smokejumpers in 1939. Helicopters flew 1,950 hours on fires. On one 1956 fire, a helicopter laid 1,000 feet of hose on a difference of elevation of 800 feet and had it in operation in 3 minutes. Ground crews would have required 30 minutes or more to do the same job.

In addition to helicopter and smokejumper activities, aircraft was used to transport manpower, deliver cargo, attack fires with water and chemicals, and to direct control campaigns. Air tankers were used extensively in California in 1956, and to a limited extent elsewhere. They proved helpful in initial attack on small fires in high-hazard areas before ground forces could arrive. They were also used in strategic attack on saddles and ridgebreaks to hold fires until they could be picked up by ground crews and in saving key spots on very big fires.

Ground fire tankers were used on 2,225 fires; 897 were initial attacks. Bulldozers, tractor plows, power brush cutters, chain saws, powered fireline trenchers, and portable two-way radios were employed more intensively and effectively than ever before.

Planning to Meet Growing Problems

Comprehensive revision and modernization of fire plans have been completed on a ranger district basis for one region and are under way in others. This need is emphasized by the impact of increasing use of national forests by recreationists and by industry.

The fire control problem on national forests in southern California is without parallel in the United States. This is due to rapidly growing populations, spread of urban developments to vulnerable foothill and mountain areas, and the semiarid climate where explosive conditions exist, The average size fire in southern California was 262 acres. This compared with 34 acres for all national forests in California and 20 acres for all national forests in the United States.

Problems vary by regions or even within States, with severity in proportion to burning conditions and risks created by heavy use of forest areas.

Cooperation With Other Agencies

The Weather Bureau contributed valuable help in providing better forecasts in the Southwest and Southeast and stepped up its service in other parts of the Nation. A new fire-weather handbook is to be prepared jointly by the Forest Service, the Weather Bureau, and bureaus of the Department of the Interior.

A series of meetings was held with top officials of the Armed Forces to determine what could be done to prevent fires caused by military operations and to insure more effective cooperation between the Forest Service and the military. Consequently, the Secretary of Defense directed the Army, Navy, and Air Force to request commanding officers throughout the Nation to establish liaison with local, State, and Federal fire control agencies.

Under the Federal Civil Defense Administration's national program of rural fire defense, delegated to the Department and redelegated to the Forest Service in 1955, guidance was provided for prevention and control of fires that could be caused by enemy action. Progress has been made in organizing the work in every State and in coordinating efforts of the many cooperating State, private, and Federal agencies.

Rangelands Managed for Sustained Production

Of the 181 million acres of national-forest land, 62 million are used by domestic livestock and are managed to provide sustained yield of the most valuable forage. Most of this area is valuable also as watershed land, much of it is used by one or more species of wildlife, and timber is produced on more than half of it. Its management for grazing domestic livestock, therefore, is correlated with management and protection of the other resources.

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Paid permits were issued to 17,628 owners of cattle and horses and 2,230 owners of sheep, to graze 1,103,439 cattle and horses and 2,731,838 sheep. In addition, 31,462 cattle and horses and 6,872 sheep were allowed to graze without charge. These livestock and their offspring grazed on national-forest lands, principally in the West. The 19,858 grazing permittees, working through 800 livestock associations and grazing boards, cooperate in managing the ranges on the basis of individual responsibility for each grazing allotment. Receipts for grazing domestic livestock on national forests under permit in 1956 totaled $2,906,282.

Additional permits to graze 247,331 cattle and horses and 90,889 sheep on land utilization project lands administered by the Forest Service were issued to 5,098 livestock owners.

Many problems, such as proper distribution and management of livestock on the range, improving forage production, and estimating grazing capacity, still exist. Studies and action programs in 1956 were aimed at helping solve the problems.

A meeting of research and administrative range and wildlife personnel was held in April to consider and recommend requirements for procedures in livestock-game range analysis. One objective established was the Servicewide correlation of livestock and big-game management plans, in cooperation with State game and fish agencies and livestock associations. Progress was made in putting these plans into effect on most of the national forests.

Standards for range conditions and trend studies were further developed and refined in 1956, particularly in areas where forage use is shared by livestock and wildlife. Balancing animal use with forage supply is one of the objectives. For some forage or vegetative types where more information is needed, such as high alpine and desert ranges, and on problems still unsolved for intermediate ranges, research is continuing to assist in developing suitable standards.

Range Improvements

Physical range improvements were made and revegetation was accomplished as follows:

	Fiscal year 1956	*Total to June 30, 1956*
Range fences—miles	233	29, 235
Water developments—number	400	18, 684
Stock driveways—miles	4	2, 901
Revegetation—acres	94, 253	743, 345

Livestock owners are showing more interest in sharing costs and responsibility in building range improvements. The degree of their participation depends partly on market and economic conditions that affect the financial ability of the individual to cooperate. However, the interest shown indicates a growing acceptance of the value of the cooperative range improvement program.

Because of improved seeding techniques, the national-forest area adaptable to treatment is increasing. It is now estimated that around 5 million acres of national-forest land can be seeded. Increased forage production can be accomplished by eliminating the competition of noxious weeds that have invaded native vegetation. Noxious weeds, such as wyethia, which have replaced valuable native plants in many areas, can now be controlled effectively by herbicides. Studies of better equipment and methods of application have been conducted cooperatively by private industry, several Federal agencies, States, and agricultural colleges.

The range seeding equipment committee continued its work. The Soil Conservation Service, Bureau of Land Management, and Bureau of Indian Affairs share costs with the Forest Service. A number of other Federal and State agencies, universities, and colleges are participating.

Wildlife Habitat—A National-Forest Resource

One-third of the Nation's big-game animals find food, shelter, and cover on the national forests. Some of the finest trout waters are in the national forests' 81,000 miles of streams and 2¼ million acres of ponds and lakes. It is impossible to closely estimate the number of small game, fur bearers, and other wildlife species on the national forests.

In 1956 more than 25 percent of the 52½ million recreational visits to the national forests were primarily to hunt and fish. Equally important to most of the other visitors was the opportunity to see and study wildlife in its natural surroundings.

Sportsman use of the national forests has increased 182 percent over 1947. This is three times the overall national trend in total hunting and fishing license sales in the United States for the same period. Number of visits by hunters and fishermen in 1947 and 1956 are compared in the following:

	Calendar year		*Percent increase over 1947*
	1947	*1956*	
Hunter visits	1, 498, 000	4, 436, 000	196
Fisherman visits	3, 446, 000	9, 499, 000	176
Total	4, 944, 000	13, 935, 000	182

Every resource management activity on national-forest land affects wildlife or wildlife habitat. In managing wildlife, the Forest Service is primarily concerned with maintaining and improving the habitat. This job is accomplished through (1) coordination and adjustment of other resource management activities, and (2) direct habitat improvement projects, usually in cooperation with State game departments.

The integration of wildlife habitat management with other resource management is the most useful tool for maintaining productive habitat. To help achieve this, a comprehensive check list of nearly 100 methods was prepared to aid forest officers in integrating wildlife habitat requirements with management of other resources.

The Forest Service, through its timber management program, is engaged in an important habitat management job. In 1956, nearly 2 million acres of forest were cut over, planted, thinned, or otherwise treated. In carrying out the timber management program of the national forests, there are many opportunities for maintaining and improving wildlife cover, openings, and foods. All are essential factors in the maintenance of satisfactory wildlife carrying capacity.

Limited wildlife management plans that serve as an in-Service guide for coordinating wildlife work with other resource management work have been completed for about 50 percent of the individual national forests. More progress in the development of comprehensive wildlife management plans is needed.

Cooperative Wildlife Activities

Cooperative planning with the States for wildlife habitat management and improvement continued in all regions. Matters considered at various meetings included fish and game habitat development and management programs, recommendations for hunting and trapping seasons, hunter and fisherman access problems, hunter fire prevention problems, and packer and outfitter operations.

Probably the most significant accomplishments in the field of cooperative relationships with States resulted from a meeting in Washington in which representatives of the Forest Service and the Executive Council of the International Association of Game, Fish, and Conservation Commissioners participated. Mutual problems in recreation and wildlife management were discussed. Basic State-Forest Service wildlife management responsibilities were reviewed and agreed upon. Forest Service policies and several important aspects of wildlife habitat management and recreation were discussed with State administrators.

The Forest Service has continued to encourage States and other organizations to engage in direct habitat improvement work on the national forests. A number of new fishing lakes have been constructed by State agencies, and others have been improved through stabilization of water levels, control of rough fish and undesirable vegetation, fertilization of ponds, and improvement of spawning beds. In several States, new wildlife food plots, openings, and water holes in dense forest types were developed and maintained.

Recreation Use Increases

Recreation visits to the national forests totaled 52½ million in 1956, surpassing the predicted use for 1956 by over 3 million. This represents an increase of 15 percent over 1955 and a 92 percent increase over 1950. Total use, by man-days, was 69.7 million as compared with 62 million man-days for 1955. The Angeles National Forest in California was most heavily used for recreation, with over 2,500,000 man-days' use recorded. The Mount Hood National Forest in Oregon led in recreation visits, with 2,600,000.

Improved camp and picnic areas, with a safe capacity of some 17,600,000 man-days' use per season, actually were used more than 27 million man-days in 1956. Such overcrowding results in accelerated deterioration of recreation facilities and in development of unsanitary conditions. It causes visitors to use unimproved areas that lack facilities, thereby creating serious fire and sanitation problems. As a step toward remedying the situation, a field survey was made on all national forests to find out what was needed to take care of present and expected future recreation use. The survey data, consolidated by national-forest regions, have been reviewed and coordinated and an action program will be recommended in 1957.

Primary Purpose of Recreation Visits

Based on the primary purpose of recreation visits to the national forests, a comparison between 1950 and 1956 shows remarkably little change in the purpose of visits to the national forests, percentagewise, although the total number of visits increased 92 percent and substantial increases in numbers were reflected in all categories. Picnicking and camping gained slightly in popularity.

Data on primary purpose of 1956 visits are compared with 1950 visits in the following:

Primary purpose:	*Calendar year 1950*		*Calendar year 1956*	
	Number	*Per-cent*	*Number*	*Per-cent*
General enjoyment of forest environment	7, 968, 582	29	14, 190, 337	27
Picnicking	6, 326, 458	23	12, 821, 767	24
Fishing	4, 885, 321	18	9, 498, 709	18
Hunting	2, 284, 643	8	4, 436, 061	8
Camping	1, 534, 108	6	3, 515, 996	7
Winter sports	1, 516, 585	6	2, 673, 270	5
Swimming	902, 172	3	1, 609, 753	3
Hiking and riding	634, 645	2	1, 352, 599	3
Organization camping, canoeing, scientific study, hobbies, wilderness travel, etc	1, 315, 285	5	2, 457, 592	5
Total	27, 367, 799	100	52, 556, 084	100

Visits to winter sports areas reached a new peak in 1956. Several new winter sports areas have been completed and others are being developed as this form of recreation use on the national forests grows in popularity. The White Pass winter sports area on the Snoqualmie National Forest in Washington was developed and operated in 1956 for the first time. A new ski lift has been installed at Timberline on the Mount Hood National Forest in Oregon. A large area is being developed on the White Mountain National Forest in New Hampshire.

Reservoirs constructed within national forests, primarily for flood control, reclamation, and power purposes, also attract thousands of recreation

visitors. To protect recreation and scenic values for future use, it is important to plan developments prior to reservoir construction.

Progress has been made in planning with the Bureau of Reclamation and the Corps of Engineers for recreation developments, prior to constructing reservoirs within national forests. Provisions for planning, financing, and developing recreation facilities around the Palisades Dam and Reservoir on the Caribou and Targhee National Forests in southern Idaho were written into the bill that authorized construction of the dam. Similar provisions were included in the bill that authorized raising the Pineview Dam on the Cache National Forest in northern Utah.

The Forest Service completed the recreation plan for the Palisades Reservoir area, the Bureau of Reclamation approved the plan, and development of the recreation area is under way. The Pineview Reservoir recreation plan has been prepared by the Forest Service and approved. Development of recreation facilities will start upon completion of the dam and reservoir construction. Preconstruction planning was also done in cooperation with the Corps of Engineers in Oregon and California.

The value of wilderness as a significant national-forest use was recognized by establishing in 1924 what is now the Gila Wilderness in New Mexico and through special protection in 1926 to parts of the Superior Roadless Area in Minnesota.

In 1929 a Secretary of Agriculture's regulation (L–20), pertaining to wilderness, was established. It authorized primitive areas within national forests for the purpose of protecting wilderness conditions. The first primitive area under this regulation was established in 1930. By 1939, 73 primitive areas and 2 roadless areas had been set aside.

The Secretary of Agriculture in 1939 established regulation U–1, authorizing wilderness areas (over 100,000 acres), and regulation U–2 for wild areas (5,000 to 100,000 acres). At that time it was announced that all existing primitive areas would be systematically restudied and portions predominantly valuable for wilderness would be reclassified under regulations U–1 and U–2. Under this policy 26 primitive areas have been reclassified and 6 new wild areas and one new roadless area have been established. Study of remaining primitive areas will be continued; meanwhile these areas will be managed under the more restrictive provisions of regulations U–1 and U–2. Three proposals for new areas, totaling some 780,000 acres, are under consideration.

During 1956 three primitive areas were reclassified as wild areas: Cucamonga and San Gorgonia in California and Maroon Bells-Snowmass in Colorado. The Yolla Bolly-Middle Eel Primitive Area in California was reclassified as a wilderness area.

Other National-Forest Land Uses

Permits are issued for special land uses, such as cabin sites, airports, radio and television sites, reservoirs, water systems, telephone and power transmission lines, municipal watersheds, resorts, stores, and organization campsites. These permits are granted for public, semipublic, and private uses of national-forest land when such use is consistent with the objectives of national-forest management. Permits totaled 56,000 and resulted in receipts of $1,154,827 for fiscal year 1956. Receipts for rental and royalties on acquired land minerals were $604,865, making a total of $1,759,692.

Area of national-forest land leased for the production of oil, gas, and other minerals increased, covering more than 7 million acres.

Determination of surface rights on mining claims under section 5 of the act of July 23, 1955, was vigorously undertaken. By the end of 1956, the Forest Service had approved 219 areas, totaling 27 million acres, for examination and report to the Bureau of Land Management. Examination was completed on 43 areas for 3,250,000 acres. The rate of progress is in line with the Department's plan to complete this work on some 120 million acres of national-forest land by 1966.

Land Utilization Projects

As of June 30, 1956, the Forest Service was administering 6,909,847 acres of land utilization project lands in 28 States and Puerto Rico. These lands, administered under title 3 of the Bankhead-Jones Farm Tenant Act, were acquired by the Federal Government during the period 1934–42 for the purpose of bringing about desirable changes in land use in problem areas; these LU lands were transferred to the Forest Service January 2, 1954. The bulk of these lands, over 6 million acres, are grassland projects located mainly in the Plains States. Forests occupy about one-half million acres in the Eastern States, and the remainder of the lands are devoted to recreation, grazing, and incidental uses.

In 1954 the Department of Agriculture established a policy for disposition of these lands. The first step in disposing of them is determination of the need for continued Federal ownership and management. The various Federal agencies with land management programs compatible with the basic purposes of the Bankhead-Jones Act were requested to determine their needs for these lands. These agencies have requested the transfer of 2,300,000 acres to their programs, and the requests are being studied. Where need for continued Federal ownership is not recognized, the LU lands may be offered for sale to State agencies, with the provision that the lands continue to be used for public purposes. Tract evaluation work and negotiations are under way for sale of 387,000 acres to authorized State agencies.

The Forest Service is in general continuing the

management policies and practices that have been followed on these projects since the lands were acquired. About 5 million acres are managed under agreements with livestock grazing associations, soil conservation districts, and other local agencies; these agreements provide for the application of measures and practices that will protect and develop the land and its resources. Major recreation developments are leased to concessionaires who provide services and facilities to the public and pay the Federal government a fixed percentage of their gross income from operation of the area. On other projects, grassland is made available to local livestock owners under permits that regulate use in terms of available forage, and timber is marked, advertised, and sold to private operators by competitive bids.

Total income from land utilization projects during fiscal year 1956 was $2,204,058.83. These receipts came from the following sources:

Grazing	$823, 118. 08
Timber	455, 814. 85
Mineral leases	799, 787. 17
Haying, sale of seed, and cropping	50, 443. 28
Recreation	29, 384. 23
Other	45, 511. 22
Total	2, 204, 058. 83

Twenty-five percent of the receipts each year is returned directly to the counties in which the LU lands are located, to be spent for schools and roads.

National-Forest Properties

National-forest properties on June 30, 1956, included 149 national forests, 25 purchase units established with approval of the National Forest Reservation Commission pursuant to the Weeks Law, 77 land utilization projects, and 12 experimental and other areas. These properties are located in 43 States, Alaska, and Puerto Rico.

	Acres
Area as of June 30, 1955	[1] 181, 002, 248
Increases:	
Purchased	19, 229
Conveyed to United States in exchange	97, 830
Donated to United States	253
Transferred from other Federal agencies	247, 187
Reserved from public domain	560
Recomputations, adjustments, and miscellaneous	773
Total	365, 832
Reductions:	
Conveyed by United States in exchange	50, 076
Grants, sales, reconveyances, and mining patents	8, 471
Transferred to other Federal agencies	248, 821
Eliminated from national forests and returned to public-domain status	308
Recomputations and adjustments	1, 722
Total	309, 398
Area as of June 30, 1956	[1] 181, 058, 682

[1] Includes experimental areas and land utilization projects administered by Forest Service prior to January 2, 1954. Does not include lands transferred to the Forest Service from Soil Conservation Service on January 2, 1954.

Area and origin of national-forest and other land administered by the Forest Service, June 30, 1956, is as follows:

	Acres
Reserved public domain	153, 938, 277
Purchased for national-forest purposes	18, 397, 274
Acquired through exchange of public domain national-forest land and timber	5, 644, 947
Acquired through exchange of national-forest land and timber obtained by purchase, donation, or transfer	1, 082, 137
Donated	408, 243
Transferred from other Federal agencies (except public domain)	1, 587, 804
Subtotal	[1] 181, 058, 682
LU lands transferred to Forest Service administration 1/2/54 [2]	6, 909, 847
Total	187, 968, 529

[1] Includes 137,726 acres of experimental and other areas, and 125,479 acres of land utilization areas administered by the Forest Service prior to January 2, 1954.

[2] Adjusted for changes occurring since transfer.

The acreage that the Forest Service administers is constantly changing due to purchase, exchanges, and other adjustments in ownership. The net effect of these changes during the year ending June 30, 1956, is shown in the tabulation on the left.

In the above tabulation, the large acreage of lands transferred to and from other Federal agencies reflects an effort to untangle a complicated Federal land pattern, which has existed in the State of Oregon. Public Law 426 of June 24, 1954, made possible the exchange of lands formerly administered in a checkerboard pattern by the Forest Service and the Bureau of Land Management, Department of the Interior; the purpose is to consolidate the areas administered by each agency.

These lands were so intermingled because the Federal Government in 1866 granted to the Oregon and California Railroad the odd sections within a certain distance of the railroad line. When the railroad did not comply with the stipulations of the grant, the lands, with others, were reclaimed by the United States and given to the Department of the Interior to administer. The even sections meantime had been included in the national forests and administered by the Forest Service along with other timber and watershed lands reserved from the public domain. Involved in the exchange were 241,137 acres of national-forest lands and 242,734 acres of revested Oregon and California Railroad grant lands in 13 counties of western Oregon.

The National Forest Reservation Commission on April 17, 1956, approved changes in national-forest purchase units established under the Weeks Law, whereby the gross area of these units will be reduced by 5,213,000 acres. The changes are to be made effective as promptly as administrative considerations permit. About 239,000 acres of national-forest land is involved. This will be exchanged for lands within the revised boundaries. The Commission also approved elimination of 8

purchase units containing 2,793,000 acres, which had been set up but in which no land had been purchased for national-forest purposes.

FOREST SERVICE, STATE, AND PRIVATE FORESTRY COOPERATION

The Weeks Act of 1911 set up a new national policy providing for the establishment of national forests on watersheds of navigable streams. It provided also for Federal-State cooperation in fire control. Section 2 of the Clarke-McNary Act of 1924 authorized the Secretary of Agriculture to enter into cooperative agreements with States for the protection of State and private forests against fire. These basic laws, later amendments, and the Cooperative Forest Management Act of 1950 provided also for cooperation with States in the production and distribution of planting stock for windbreaks, shelterbelts, and farm woodlands, and for general technical forestry assistance to States, community and private agencies, and others.

Cooperative Forest Management

Forty-one States were active in the cooperative forest management program in 1956, under which technical forest management assistance was provided 38,121 farmers and other small woodland owners. Pennsylvania, Utah, and Montana came into the program during the year. Better management was applied to over 3 million acres of woodland property. Income from products harvested brought cash returns of $14,757,555 to the owners. Owners carried out cutting and marketing operations and received a substantial return for their efforts in harvesting the woodland crop.

In addition to the efforts of the Forest Service and States in working with small forest-land owners, industry and private consulting foresters are providing assistance. Southern pulpwood company foresters assisted 9,806 landowners in 1956.

Since 74 percent of the Nation's private commercial forest land is in the hands of some 4½ million small owners, a big job still remains to be done. As a result of the combined efforts of technical foresters, slightly more than 1 percent of the total number of small woodland owners in the United States were reached last year. In addition to assistance provided small woodland owners, 6,405 sawmill operators and primary forest-products processors were helped to do a better job of cutting and processing the tree crop.

General Forestry Assistance

The Forest Service, designated as the Department's principal forestry agency, provided technical forest management assistance to other Federal, State, community, and private agencies as well as to colleges, forest industries, private consulting foresters, and large forest-land owners. In addition to routine information, highly specialized assistance in technical problems of inventory and management was given. One of the most pressing problems is the need in 27 States, which include large areas of rural underemployment, for new forest industries and expansion of markets to utilize surpluses of both farm labor and tree volumes.

A study made in the middle Connecticut valley examined possibilities of marketing an annual growth of 200,000 cords of surplus hardwoods. The New England Council for Economic Development published the study, which was a cooperative effort of the Forest Service, State forestry agencies, the Connecticut River Watershed Council, other agencies, and individuals. Local economic groups in this area are encouraging new forest industries to study the possibility of establishing factories in the region to use the surplus hardwoods and provide gainful employment to local people.

Production of Trees

Production of trees under section 4 of the Clarke-McNary Act reached 560 million in 1956, with 44 States, Hawaii, and Puerto Rico participating in the program. The increase of 63 million trees over 1955 resulted from development of new nursery facilities, particularly in the South. Minnesota joined the program in 1956. The cooperative endeavor was financed by States paying $1.8 million, the Federal government $0.5 million, and private landowners $2.5 million. Trees produced were distributed for planting denuded and poorly stocked forest lands, shelterbelts, and former agricultural lands.

A large part of this acreage is privately owned. In spite of interest and an upward trend in planting, progress made to date on public and private land has not materially reduced the backlog of 52 million acres in need of planting. Acreage is added to the backlog currently as planting needs are created through cutting and fire.

Tree Planting

The Division of Cooperative Tree Planting was formally established in June, to implement tree planting activities authorized by the Agricultural Act of 1956. Title 1 of this act provides for tree planting as one of the conservation practices to be applied on land withdrawn from cultivation under the Conservation Reserve. Title 4 of the act authorizes the Secretary to assist States on a fund-matching basis in carrying out forestation of forest land. Assistance to States, authorized by title 4, should be helpful in speeding up the forestation of the more than 50 million acres in all ownerships of nonstocked and understocked forest land.

The Secretary designated the Forest Service as the agency responsible under the Soil Bank program for technical phases (other than soil suitability determinations where needed) of conservation practices involving the establishment of forest plantings. This includes providing necessary technical assistance, developing specifications for forestry practices, working with State and county committees, determining performance in meeting these specifications, and expanding production of forest tree seedlings necessary for the program, primarily through facilities of State forestry departments.

State foresters have been very cooperative in entering into agreements and preparing plans to provide for expanded nursery production and technical assistance to supply the anticipated increase in demand due to Soil Bank planting. Prospects are good that most of the necessary added nursery capacity will be developed and seeded by the spring of 1957. The required technical assistance is expected to be available when needed.

Flood Prevention Programs

Activities Under Public Law 566

Under Public Law 566 (83d Congress), the Forest Service participated with the Soil Conservation Service in developing work plans for 100 of the 172 watersheds approved for planning assistance. National forests were involved in 17 of the 100 watersheds. Works of improvement were initiated on one project authorized by Congress for an action program. Authority to proceed on 24 additional projects was granted. The Forest Service and State Foresters will participate actively in 12 of these 24 projects. Where privately owned forest lands are involved, State foresters are in charge of applying forestry measures.

The Forest Service worked with the Soil Conservation Service and the Agricultural Research Service in appraising impact of projects proposed by the Corps of Engineers on forest resources and forest resource management in the lower Mississippi River and tributaries and in the Columbia River basin. It entered into arrangements for similar studies of the Corps' survey of the Delaware River basin and the Bureau of Reclamation's Upper Colorado River Storage Project.

Watershed Protection Demonstration Projects

This program, the forerunner of the Watershed Protection and Flood Prevention Act of 1954, is limited to 65 selected watersheds nationwide, 58 of which have been approved for action programs. The program is designed to show what upstream watershed treatment can do in preventing floods and controlling sediment. The Forest Service, working cooperatively with the Soil Conservation Service, State foresters, and local project sponsors, handles forest land aspects of the program. Under this program, in 1956, forestry phases of flood prevention measures were completed on 8 projects involving national forests, and assistance was given State forestry agencies in applying such measures on 37 additional projects. Four thousand acres of sediment-source areas were planted to trees; 500 acres of terraces were constructed; woodland management plans were developed for 32,700 acres; and assistance was provided to 1,040 woodland owners and operators.

Under the Flood Control Act of 1944, watershed treatment and upstream flood prevention activities were authorized on 11 watersheds. The Forest Service participated actively in work on 6. Forty-seven million trees were planted on 37,000 acres of critically eroded land; 1,300 forest and woodland owners and operators were assisted in managing 18,000 acres of woodland. Additional fire prevention and control measures were provided on 540,000 acres of valuable watershed lands.

Emergency Flood Prevention Projects

Section 216 of the 1950 Flood Control Act authorized the Department to expend for emergency flood prevention, as required, a limited amount of current flood prevention project funds. Under this provision, five emergency projects involving national-forest land were completed in 1956. Four were in California, the fifth in Wyoming. Watersheds treated under this provision are those where it is necessary to do emergency flood prevention work because a substantial flood threat to life and property has been created as a result of a natural disaster such as fire or tornado denuding the watershed or disrupting the natural stream channels of upstream areas.

In 1956, more than 300,000 pounds of rapid-germinating ryegrass, mustard, brome, and other seeds were sown by helicopter or airplane, to provide an immediate protective cover on 68,400 acres of burned area. In addition, 47 miles of clogged channels were cleared and 16 miles of fire control lanes and trails were stabilized.

Forest Insects and Disease

Control of forest insects and disease must be accomplished on a cooperative basis since pests recognize no land ownership boundary lines. Control on one area may be ineffective if adjoining affected areas are not treated. A major portion of the forest insect and disease control job remaining to be done is on non-Federal lands. Some of these lands are not receiving protection, and extensive losses are occurring.

The Forest Pest Control Act of 1947 provides for the control of forest insects and diseases on Federal lands and for Federal participation in control programs on non-Federal lands through cooperative agreements with appropriate State officials and private landowners.

Some insect and disease loss is unavoidable and is nature's way of removing old, decadent, susceptible, and less hardy trees. Frequently, because of favorable biological conditions, insects multiply rapidly and invade healthy stands of valuable commercial timber. Large quantities of valuable timber can be killed before the infestation subsides naturally if control measures are not applied. Cone and seed insects may deplete seed crops; other insects may wipe out young stands or seriously injure plantations. Diseases kill forest trees, lower the growth rate of others, and impair quality of wood products.

Good forest management and sound silvicultural practices are the first defense against forest pests. Well-planned cutting procedures, good methods of handling forests, and salvage activities have demonstrated effective control of many forest pests.

Under some conditions insect epidemics will occur, regardless of forest management and silvicultural practices in effect. Salvage cutting is a helpful tool in controlling some infestations. However, immediate and direct action is necessary in other situations to control epidemics and save trees having commercial value or those valuable for watershed protection, wildlife, and recreation. In planning and executing programs, care is taken to obtain the most effective control of forest pests with minimum damage to associated plant and animal life.

During 1956 an estimated 818 million board-feet of dead, down, insect-infested, and susceptible timber was salvaged through commercial timber sales in the interest of bark beetle control on national forests. On Federal lands, 304,792 trees infested with bark beetles were treated; 1,366,900 acres of Douglas-fir were treated with aerial chemical spray to control epidemics of spruce budworm; 98,900 acres of forest land were treated for miscellaneous forest insects and diseases.

Under cooperative agreements, projects were carried on in 9 States in which 13,750 forest trees were treated for bark beetles and 110,000 acres of forest land were sprayed from the air for spruce budworm. Many other control projects were conducted on State and Federal land by the Forest Service, State officials, private industry, and individuals.

During 1956, 13½ million ribes, the alternate hosts that spread white pine blister rust disease, were eradicated from 722,351 acres. In addition, more than 2 million acres were surveyed to determine the status of the disease, the need for ribes eradication, and the value of unprotected white pine stands.

Cooperative projects are being conducted in Pennsylvania and North Carolina to control oak wilt. It is being accomplished largely through logging. As surveys are made of areas susceptible to this disease, it is probable that direct action will be needed to treat isolated infection centers that cannot be logged.

Cooperative Fire Control

The Forest Service cooperates with 44 States and Hawaii in protecting 389,924,000 acres of non-Federal forest lands from fire. This is an increase of 2,768,000 acres over 1955, but 41,185,000 acres remain without organized protection.

Fires on lands under organized protection averaged 19 acres each and burned only 0.4 percent of the acreage. In comparison, 49,147 fires on land not under organized protection averaged 94 acres per fire. Fires on the unprotected land burned 11.2 percent of the area or 28 times the percentage burned on protected land.

Protection Needs and Responsibility

A survey was started in 1956 to compute the needs in each State for protection of woodlands from fire. The survey is intended to determine the area of non-Federal forest land that should be protected under the Clarke-McNary forest fire control program and what the cost of that protection would be for each State. Representatives from State forest fire fighting agencies, forest industries, and the Forest Service agreed upon guidelines for surveying the equipment, tools, supplies, manpower, and buildings needed to do the job. Estimates included needs for new equipment as well as for replacements.

The rapidly expanding economy and great population growth, with resultant demands for wood and water, emphasize the need for this kind of survey to assure that the most effective and economical forest resource protection is obtained.

In addition to the survey, which will summarize the State foresters' needs in providing organized protection for State and private forest lands, a review was started to determine the total cost of adequate protection of non-Federal lands and the relative degree of participation of Federal, State, and private financing. This study will be made under contract, by a non-Government organization. Representatives of forest industries, forestry schools, conservation organizations, and State foresters are serving as advisors.

Interstate Fire Protection Compacts

The Southeastern Interstate Forest Fire Protection Compact has now been ratified by all 11 southeastern member States, Virginia having ratified it in 1956.

The Middle Atlantic Interstate Forest Fire Protection Compact was authorized by the 84th Congress. This includes Delaware, Maryland, New Jersey, Pennsylvania, Virginia, and West Virginia and has been ratified by all except the last two.

Four interstate forest fire protection compacts have been authorized in the East and South, with 25 member States. The compacts are designed to correlate fire control activities among States

and provide for mutual aid across State lines during periods of extreme emergency. Training and planning programs are being formulated or are under way in all four compacting groups.

Forest Fire Prevention Program

Success of the 1956 cooperative forest fire prevention campaign, which used as its theme "Join Smokey's Campaign, Prevent Forest Fires," was reflected in the best record on number of man-caused fires and acreage of forest land burned of any year since World War II.

The Advertising Council, Inc., State forestry departments, and the Forest Service plan and execute the campaign each year. The 1956 campaign material attained greater popularity and was more widely used than ever before. Requests for Smokey junior forest ranger kits reached 500,000, double the number in 1955.

A cooperative agreement, approved by the Association of State Foresters, the board of directors of the Canadian Forestry Association, the Forest Service, and The Advertising Council, Inc., was put into effect in 1956. It permits the Canadian Forestry Association to sponsor Smokey Bear in Canada and to use Smokey Bear material.

Several new television spots featuring the "Little Boy and Smokey Bear" were produced and are being widely used. A fire-prevention film, "Vision in the Forest," featuring the Vaughn Monroe family, was produced in 1956 and is being used throughout the Nation.

FOREST RESEARCH

Progress in forestry is closely linked with research. Each problem solved permits another step forward in improving practices, making better use of products, and intensifying multiple-use management of forests and related rangelands. Forest research covers a wide field of endeavor, including protection and management of forests, related rangelands, wildlife habitat, and watersheds; utilization and marketing of forest products; and forest economics.

The Forest Service's nine regional forest and range experiment stations, two research units in Alaska and Puerto Rico, and its central Forest Products Laboratory at Madison, Wis., continuously report new facts about forests and related resources. Much of this research is carried out in cooperation with other Federal agencies, both inside and outside the Department of Agriculture, and with State and private agencies, organizations, institutions, and individuals. Research reports are published currently and are available for distribution. Some research findings are reported in this section.

Culture and Regeneration of Forests

Appraisal of the Great Plains Shelterbelts

During the period of 1935 to 1943, 18,600 miles of windbreak strips were planted on 30,000 farms to help protect the drought-stricken lands from wind erosion and dust storms. In 1956 an examination of these plantations shows that 48 percent of the windbreaks are in good or excellent condition; 29 percent, fair; 18 percent, poor; and 5 percent, destroyed.

Performance records of the trees planted provide an excellent basis for determining the suitability of different species for shelterbelts. Eastern redcedar, Rocky Mountain juniper, and ponderosa and Austrian pine proved particularly desirable because of hardiness and the barrier density provided with a minimum of rows. These species were superior to hardwoods in (1) furnishing better yearlong protection, (2) growing better on the more severe sites, (3) living longer, (4) competing less, for moisture, with crops on adjacent lands, and (5) being less subject to livestock damage.

Aerial Seeding of Longleaf Pine

Despite the long record of discouraging results in direct seeding of denuded timberland by airplanes, research efforts along these lines were renewed in attacking the regeneration problem of longleaf pine. First attempts met with customary failure, but eventually tne primary cause for poor results was traced to birds.

Intensive tests verified the enormous consumptive capacity of the bird population for tree seed. The next step was to devise some means of protecting the seed sown; this was accomplished by a harmless repellent coating. Two repellents have proved to be unusually effective. One appears to have the additional advantage of repelling rodents.

As a result of the studies, 26,000 acres of longleaf pine have been successfully reforested by hand or aerial seeding. In Louisiana, 9 major landowners seeded 5,000 acres, largely by aerial methods. These techniques are now being tried on other species. Aerial seeding can be done for about 50 cents an acre plus the cost of seed, which amounts to considerably less than the cost of planting.

Seed Trees and Seed Crops

Information on the type of trees that bear seed abundantly and frequently and how much seed they bear is needed by foresters. This and additional data on factors affecting cone crops were summarized in a study recently completed in the pine region of California. Results indicate that nearly all ponderosa and sugar pine seed was

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borne on dominant trees; in fact, 98 percent of the cones were borne on trees of this class. Trees of other classes produced very little seed. Good seed crops of the pines were infrequent and irregular, varying from 1 to 8 years apart. During the period of study, no tree bore cones every year, but 85 percent of the ponderosa pine and 35 percent of the sugar pine bore cones in half of the years. A higher proportion of good seed was produced in years of heavy seed crops.

On the basis of the study, recommendations were made concerning number, class, and size of trees required after cutting, to yield seed sufficient for establishing acceptable reproduction.

Growing Southern Pines

Planting, caring for, managing, measuring, harvesting, and marketing the timber crop are described in three new Department of Agriculture Farmers' Bulletins No. 2097, 2102, and 2103. These were prepared to inform farm woodland owners and small timberland investors who want to grow loblolly, shortleaf, and slash pines throughout their natural range.

Protecting and Improving Water Yields

Measuring Transpiration

An infrared gas analyzer has been adapted by the Forest Service in Arizona for measuring transpiration by individual plants. This instrument, successfully tested in the laboratory, is being tested on plants growing under natural conditions in the field in order to determine water-use characteristics of the different plant species grouped generally as phreatophytes.

Predicting Soil Moisture

A study carried on in cooperation with the Waterways Experiment Station at Vicksburg, Miss., has resulted in the development of a method of predicting soil moisture under a wide variety of conditions covering large areas in the continental United States, Alaska, and Puerto Rico. Such information is basic to determining the trafficability of soils for vehicles. It also has possible application in making plans for grazing, planting, and other operations that might be affected by soil moisture.

Tractor Logging Soil Disturbance

Erosion measurements in ponderosa pine stands indicate that soil disturbances by prevailing tractor logging methods occurred on from 4 to nearly 14 percent of the area logged. Haul roads were responsible for 45 percent of the total area disturbed; skid trails, 40 percent; and landings, 15 percent. Thus, if soil disturbance and erosion are to be kept at acceptable minimums, logging operations must be laid out to keep roads and trails at a minimum or, in particularly unstable areas, to use some other method than tractors to remove timber.

Managing Forage and Wildlife Habitat Resources

Forage Increase—Control of Low-Value Vegetation

In Southwestern studies, range productivity has been trebled through juniper control and managed grazing, but natural recovery to maximum production often requires 10 years. Most practical control method to date is dozing out the trees by tractor. Prescribed burning has not been generally successful for sprouting species of juniper and brush. More detailed prescriptions for the use of fire must be worked out before large-scale application can be recommended in the Southwest. Effects of mechanical and chemical control methods are being studied in cooperation with the Agricultural Research Service.

Management of Seeded Ranges

The impact of different rates of cattle grazing on crested wheatgrass range is reflected in studies of grazing practices for spring-fall ranges at Benmore, Utah, in cooperation with Utah Agricultural Experiment Station. For the first few years, cattle gains per acre tended to be highest under a heavy stocking rate, which utilized 80 percent of the grass annually. Continued heavy use, however, has reduced grass vigor and production and permitted invasion of weeds and sagebrush.

Cattle and Timber on Southeastern Pine Lands

Specific relations between tree cover and forage production in the South have been worked out and expressed in a mathematical formula. This provides a basis for adjusting cattle stocking to forest conditions in the longleaf-slash pine type; it also gives a basis for estimating changes in forage production to be expected under different timber management practices. Grazeable amounts of forage are produced under well-stocked pine stands where litter and rough are removed by periodic prescribed burning.

Wildlife-Habitat Research in the South

Game is becoming an increasingly important product of forest lands in the South. Deer, for example, were scarce 20 years ago, but are now numbered by the thousands and are increasing rapidly. Squirrels and turkeys are also important forest game, along with many other species. A survey in Louisiana indicates that the majority of commercial forest-land owners wish to consider wildlife in their forest management plans. Analysis of the problems reveals great need for additional

knowledge on integrating production of timber with game, livestock grazing, or other uses under efficient multiple-use management.

Seeding Bitterbrush to Improve Big-Game Range

Successful seeding of bitterbrush, one of the most valuable western browse plants for livestock as well as big game, is exacting. In studies in California and Idaho, appropriate depth, time of planting, and seeding rate have been found to vary with annual precipitation, soils, and hazards of frost heaving. Improvement of bitterbrush seed stock through selection and development of strains that sprout after burning seems promising. Studies in Idaho, where sprouting is fairly common, showed this character to be influenced by both genetic and environmental factors. Investigations of the inheritance and morphology of sprouting have been initiated in cooperation with the University of California.

Protection from Fire, Insects, and Disease

Fighting Fire From the Air

Progress was made in developing more effective direct support of ground fire fighting crews by aircraft. Low-level airplane drops of 100 to 500 gallons of bulk water or chemical were shown to be capable of checking small brush or grass fires, as well as critical sectors of large fires, until ground forces can get control. Seven spray planes were modified for water dropping and were tried out on California fires, with encouraging results.

Arrangements were completed with the Army Corps of Engineers and California Division of Forestry to conduct a 3-year cooperative project to develop the full potential of helicopters for tactical use in fighting fires. Helicopters equipped with special hose trays have been used to lay fire hose quickly and accurately in dense brush and rugged terrain. This opens the way for more effective tactics in preventing disaster fires.

Lightning Fire Study

Project Skyfire, the cooperative study of fire-setting lightning storms, based at Missoula, Mont., produced much new information on the atmospheric conditions under which various types of lightning storms develop. A mobile radar unit made it possible to track storms and to chart their life history. Pioneering tests to determine the effects of cloud seeding on lightning were carried out in Arizona and Montana, with the assistance of the President's Advisory Committee on Weather Control, the Weather Bureau, the Munitalp Foundation, and others. Results indicate that it may be possible to prevent some lightning fires.

Anticipating Behavior of Large Fires

Winds aloft and other upper atmospheric conditions were found to affect the behavior of many forest fires. Another factor was rugged topography, which in creating complex wind patterns caused fires to spread erratically. Attention was focused on this aspect by the tragic loss of lives on the California fires. Research on this problem, to anticipate what the interactions will be between fire and its environment, was started in California.

Fire Research Committee and Conference

A fire research committee and conference group was organized by the National Academy of Sciences–National Research Council and sponsored by the Federal Civil Defense Administration. Its purpose is to correlate the basic research needs of all fire-fighting agencies and to enlist the aid of top scientists throughout the country in determining the natural laws that govern the development of mass fires burning in free space. Because forest fires are of this character, the Forest Service has an important role in this undertaking.

Extending Cooperative Fire Research

Plans for giving more effective research service to the Bureau of Land Management, Department of the Interior, resulted in a preliminary survey to determine critical fire problems of interior Alaska and research needed to make action programs effective. A preliminary system of rating the degree of danger from forest fires under Alaskan conditions is being tested.

At the request of the State of Georgia, a special survey of forest fire control problems and research needs was carried out through a cooperative arrangement between the Forest Service and Georgia.

Plans were completed for preparation of a fire-weather handbook as a joint project among fire control and fire research men of the Forest Service, fire-weather experts of the Weather Bureau, and foresters in the U. S. Department of the Interior. This will serve the vital needs of personnel of all agencies responsible for fighting forest fires.

Black-headed Budworms Cause Losses in Alaska

A study was made in 1956 to determine the losses caused by black-headed budworm in one of the severely defoliated stands of western hemlock in Alaska. By estimate, the study area contained 36,000 trees more than 11 inches in diameter at breast height. Of these, 4,600 were killed and 10,000 were damaged. Volume loss was more than 7,000 board-feet per acre. These results will be valuable in determining possible need for control.

Borers Degrade Hardwoods

Insects that bore into living hardwood trees in the South cause severe losses in the value of hardwood lumber. Logs taken from 10 trees of each of 3 species of southern oaks—Nuttall, willow, and overcup—were examined. They yielded a total of 9,469 board-feet of rough lumber, valued at an average of $77.00 per

thousand at current market prices. The same lumber, with insect-caused defects disregarded in grading, would have been worth an average of $98.90 per thousand. The trees from which the logs were taken showed only a medium amount of damage.

Termite Damage Prevented by Chemicals

In 1948, samples of wallboards and insulation panels were dipped for 10 seconds in (1) 10 percent sodium arsenite in water, (2) 2 percent copper naphthenate in oil, and (3) 5 percent pentachlorophenol in oil. Immediately following treatment, the samples were placed outdoors where they were exposed to termite attack. There they have remained continuously ever since. So far, none of the samples has been damaged to any appreciable extent. In contrast, untreated samples exposed at the same time were damaged severely within 1 or 2 years.

Bark Beetle Research in the Southwest

Research on bark beetles destroying pine trees in Arizona and New Mexico was started in 1956. Results of this research will be useful in developing effective control measures for several damaging pest species.

Controlling Nantucket Pine Moth

A key to success in preventing severe loss in height growth of young pines in the South as a result of Nantucket pine moth attack appears to lie in the timing of spray applications. This was indicated in recent research where a water-emulsion spray containing 5 percent DDT was applied to young pines early in the season in Mississippi, just before or during the first flight of the moth. Results showed that the sprayed trees accomplished most of their normal height growth for the year.

Predicting Outbreaks of Five-Spined Engraver Beetle

According to results obtained in a 12-year study, outbreaks of the California five-spined engraver beetle in ponderosa pine stands in California are influenced chiefly by abnormally dry weather from April to July and by the amount of logging slash left on the ground in the spring. By keeping track of these conditions, it appears possible to predict outbreaks of the insect.

Parasites Attack Spruce Budworm

Studies of the spruce budworm in Oregon and Washington in 1955 and 1956 showed that the population was heavily attacked by natural enemies and its trend was downward in some areas. As a result, plans for airplane spraying of such areas in 1956 and 1957 were suspended. Plans for the control of an outbreak of the Douglas-fir tussock moth in the northern Rockies in 1956 were canceled when research scientists showed a definite reduction in moth population as a result of parasitization. As a result of these research findings, several hundred thousand dollars in spraying costs were saved. In addition, the studies provide opportunities for evaluating the effectiveness of natural control.

Chemical Control of Some Forest Diseases

More effective and less expensive direct control through application of chemicals is nearer realization for at least two of our more serious forest tree diseases. As a result of nearly 300 screening tests, carbamic acid and 2,4–D have been found to be toxic to dwarfmistletoe plants without seriously injuring the pine host. Dwarfmistletoes are abundant in western coniferous forests where they kill many young trees and reduce the rate of growth and quality of wood produced in older stands. It has also been found that Fermate effectively protects sugar pine nursery seedlings from white pine blister rust.

Forest Trees Tested for Immunity to Diseases

Permanent indirect control of forest tree diseases can be secured by finding genetic resistance or immunity to specific diseases. Stock of western white pine apparently resistant to white pine blister rust has been field selected and is being rigorously tested. The same is being done for sugar pine and eastern white pine in their respective ranges. Shortleaf pine with apparent resistance to the littleleaf disease has been located. The progress of chestnut blight has been followed in the East, and several apparently resistant American chestnut trees have been found. Scion wood was collected this year from 28 more of these rugged survivors and distributed to cooperators for grafting to other root stocks for multiplication and even more severe testing of their resistance.

Preventing Decay of Wood in Use

A laboratory method for evaluating wood preservatives, in which small blocks of treated wood are placed on a soil base and subjected to decay by test fungi, has been perfected and was adopted as a standard by the American Society for Testing Materials. Other studies have shown that the introduction of a simple borax plus boric acid mixture beneath the wooden decks of aircraft carriers greatly retards decay in critical places. Research shows that relatively simple changes in wooden boat design and construction will reduce or prevent decay losses.

Improved Processing and Use of Forest Products

Utilization of Low-grade Hardwoods

Forest surveys show that a large share of our standing and growing timber is made up of deformed, stunted, and cull trees. Much of this timber, particularly hardwoods, includes species that we do not now want to use or do not know

how to use. Removing them to pave the way for replanting with higher valued species is not practical because of low market value. It is the job of utilization research to find uses for these trees and thus to give them market value. Examples of this research follow.

The new cold soda pulping process, developed at the Forest Products Laboratory, has proved adaptable to a variety of hardwood species; in addition, pulp yield by this process approaches 95 percent, a much better yield than the 45 percent by conventional chemical pulping, and somewhat better than the 85 percent by semichemical pulping. The process appears to be suitable for continuous as well as batch pulping.

Many of the hardwoods are difficult to season, and their use may be limited for that reason. Work on seasoning of hardwoods shows encouraging results. For example, a very rapid schedule for kiln-drying ½-inch oak paneling has been developed.

Resin-impregnated paper bonded to the surface of boards or plywood does an effective job of masking unsightly defects. Material of a class completely unsuitable for uses where appearance is a factor, siding for example, may be effectively upgraded in appearance and value, by the use of such overlays, which offer an excellent base for painting.

Hardwoods present abnormalities that affect utilization. For example, the gelatinous fibers in some hardwoods cause abnormal shrinkage, fuzzing during machining, and other problems. Fundamental information on these fibers, as a basis for overcoming their adverse effects, is being gathered.

Kilns of various types are being studied, to evaluate the technical and economic problems involved in the conversion of low-grade hardwoods to charcoal. This is a promising outlet for otherwise unusable material.

Considerable progress has been made in obtaining fundamental information on chemical reactions that can serve as the base for developing a multiproduct chemical industry, with wood as a raw material.

Helping the Homeowner

Housing is one of the large outlets for timber as framing, sheathing, siding, and trim. The solution of problems relating to homes has, therefore, a several-sided aspect in that they are of interest to the forester, the lumber industry, builders, and the homeowner. Agriculture Handbook No. 73, Wood-Frame House Construction, illustrates and describes good practice in house construction.

A new natural finish, although not proved under long-time testing, looked so promising that the Forest Products Laboratory announced it rather early in development. The finish gives promise of lasting at least 4 years; most of the natural finishes now being used have a service life of about 1 year. A Department publication, Home and Garden Bulletin No. 52, Wood Siding, How To Install It, Paint It, Care for It, solves many of the homemaker's problems in the selection and application of house paint.

Making Wood Last Longer

Work has continued on improving effectiveness of wood preservative treatments and simplifying methods of application. One of the most promising methods is the so-called double-diffusion treatment, in which two water-soluble chemicals, diffused into wood, react to form an insoluble, nonleachable compound in the wood. Although this was originally intended primarily as a method easy to use in treating farm timbers, it has proved successful in treating wood cooling towers, where decay is a serious problem.

Resource Surveys and Economics Investigations

Continued Progress Made on the Forest Survey

During the past year, 38 million acres of forest land were inventoried, to determine availability of timber supplies, condition of forest stands, timber cut and mortality, and present and prospective growth of timber. Coverage included initial surveys of 10 million acres in 7 States and southeast Alaska. Resurveys totaling 28 million acres were also made in 9 States, to bring resource information up to date and to appraise trends in forest conditions and program needs.

Forest Situation Improving in East Texas

The forest survey in southeast Texas, where forest holdings are relatively large, shows that forest area, timber volumes, and timber growth have increased significantly in the past 20 years in spite of a major expansion of the pulp and paper industry in that area. On the other hand, in northeast Texas, where holdings are mainly small, stocking of both merchantable trees and young growth has dropped as the result of heavy cutting, fires, and grazing. Details are given in Forest Survey Release No. 77, Forests of East Texas, 1953–55, published by Southern Forest Experiment Station.

Forest Survey Techniques Improved

Studies are underway to determine the effectiveness of large-scale aerial photographs in identifying species and measuring tree volume. Photo volume tables are being developed for various western species, for southern pine, and for use in the initial survey of interior Alaska. Maximum use must be made here of aerial methods in conducting forest surveys. An experimental design for a system of continuous forest inventories is being developed and tested in the Northeast.

Studies on Markets for Low-Quality Timber

Possibilities for developing new or expanded markets for little-used species, low-quality trees, and unused plant residues are being explored in several areas where such materials represent a potential base for forest industry. Studies in the Southeast indicate the conditions under which woods and mill residues can be economically assembled and processed for use as pulp chips.

State Forest Tax Law Digest, 1956, was issued, to provide a basic reference source summarizing the 44 State forest tax laws in 31 States and territories. This new edition covers forest severance taxes as well as other special forms of forest taxation; it supplements a recently issued compilation of State guides for assessing forest lands and timber.

Economic Guides for Timber Management

A comprehensive report, Financial Maturity: A Guide to Profitable Timber Growing, published as Department of Agriculture Technical Bulletin No. 1146, outlines procedures for evaluating timber management alternatives and for maximizing the net income of a forest business. The financial maturity principle provides a guide for making cutting decisions; it can be applied to any species, under any silvicultural system, and for any product or combination of products.

ADMINISTRATIVE MANAGEMENT AND FISCAL CONTROL

Better management in all Forest Service functions was emphasized in 1956 through improved methods and specialized training programs. One example is the Servicewide program to coordinate the supply system and eliminate duplication of stocking. This has saved time and funds. Under authority of the General Services Administration, contracts were negotiated for professional engineering services and for surveys, plans, and designs for roads, trails, bridges, dams, buildings, and cadastres. In view of the critical shortage of qualified engineering employees, this authority to use private engineering firms under contract will help in portions of the construction program.

Greater efficiency and economy were achieved in forest communications by the use of a new line of hand-held, packset-type, portable radio equipment. It is lighter and has higher power and lower battery drain than radio equipment formerly available.

Personnel

On June 30, 1956, a total of 9,480 permanent yearlong employees and 11,032 temporary seasonal employees were engaged in work of the Forest Service: administration of the national forests, cooperation in State and private forestry, and research.

During the year, 123 persons retired optionally or because they reached mandatory retirement age. The average age of the retirees was 62.16 years, and they had worked an average of 28.9 years. In addition to the 123 optional and mandatory age retirements 37 persons retired for disability in 1956.

Training

Increased volume of work, added management emphasis, and broadened programs sparked one of the most intense training schedules in the history of the Service. Regions and experiment stations participated in specialized training and strengthened their training organizations.

A formal trainee program was launched for student foresters. A planning guide was developed for use in the recruitment and training program. Its objectives are to improve efficiency and increase competence of employees by broadening their early understanding of programs and activities.

Field trips into Montana national forests for faculties from selected schools of forestry, engineering, and public administration from all over the Nation, aided in coordinating educational work training.

The foreign trainee program in tropical forestry was continued at Puerto Rico. A field trip for training Washington Office clerical-administrative personnel was made to the George Washington National Forest in Virginia. Added national emphasis was given to individual training, and a Chief's advisory committee on personnel development was planned to speed progress in technical competence. Minimum Servicewide training standards were prepared for field review.

Safety

Emphasis was placed on employee training and advance planning of safety programs for projects, many of which carry a high degree of hazard. Unprecedented losses on 436 wildfires in California in August caused an upsurge in death and injury frequency rates. Of 455 injuries throughout the Service, 100 were California fire cases. The overall injury rate for 1956 was only slightly above that for the previous year, despite the exceptional injuries and tragic losses on the California fires.

Work was started on revision of the safety code. It will be completed and issued in 1957.

Fiscal Control

Several advancements in fiscal procedure were made in 1956, to provide management with better financial data and to process accounting operations at less cost.

The centralized pilot plant experiment established in 1955, to process fiscal and accounting operations automatically, proved successful, and the method has been adopted Servicewide.

Financing and accounting for automotive and heavy construction equipment use were placed under a working capital fund in one region, and plans were completed for extending it to all regions early in 1957.

A change in collection and refund procedure, under which a consolidated fund is used for all types of timber sale deposits, resulted in better accounting control at less cost. Approximately 50,000 line items on billings and accounts have been eliminated.

Receipts from the national forests deposited to the forest reserve fund in fiscal year 1956 amounted to $111,739,132. Sources of the receipts were as follows:

Timber	$107, 073, 158
Grazing	2, 906, 282
Other land uses	1, 759, 692
Total	111, 739, 132

Other receipts included $2,485,782 from national-forest revested Oregon and California Railroad grant lands and $568,184 from Tongass Indian lands (Alaska). Receipts from land utilization areas (title 3 of the Farm Tenant Act) were $2,204,059 and other miscellaneous receipts amounted to $808,704; $7,919,080 was deposited by cooperators and timber purchasers for work on national forest programs, of which $7,207,620 was for timber stand improvement.

Receipts from national-forest resources and land utilization projects totaled $118,517,321 (excluding cooperative deposit investment receipts of $7,207,620). Operating expenses for national-forest programs and land utilization projects amounted to $62,094,122 and depreciation on roads, trails, and other improvements was estimated at $17,192,000. The combined operating receipts exceeded operating expenditures, plus estimated depreciation, by $39,231,199 for fiscal year 1956.

Expenditures on other programs for which the Forest Service is assigned administrative responsibility include $14,587,754 for State and private forestry programs and $8,898,622 for forest research activities. Details on cooperative deposits and other nonappropriated expenditures are given in tables 13 and 14, which list receipts by sources, and expenditures by primary purpose of appropriation.

Under the forest reserve fund act of May 23, 1908, and amendments, 25 percent of the national-forest receipts deposited to that fund, excepting some special allocations, is returned to the States and is allotted by the States to counties or parishes on the basis of national-forest acreage, for expenditure as provided under State law, on schools and roads. A total of $27,893,210 was returned to the States under this provision; $129,404 was paid to Arizona and New Mexico school funds under the act of June 20, 1910; $46,497 was paid to the State of Minnesota under the act of June 22, 1948. Counties were paid $459,795 under title 3 of the Bankhead-Jones Farm Tenant Land Act, and $142,046 was paid to Alaska, from fiscal year 1956 Tongass Indian land receipts under the Act of July 24, 1956. In addition $455,087 was paid to Alaska under this Act representing 25 percent of receipts collected for fiscal years 1948 through 1955, formerly held in escrow.

Of the $2,485,782 receipts collected from national-forest revested Oregon and California Railroad grant lands listed above, 75 percent was returned to the counties concerned, as provided for under the act of June 24, 1954.

An additional 10 percent of the base receipts, $11,398,645, was appropriated to the Forest Service for expenditure on roads and trails within the national forests.

STATISTICAL TABLES

TABLE 1.—*National forest and other lands administered by the Forest Service, as of June 30, 1956*

State	National forests	Land utilization projects	Other	Total
	Acres	*Acres*	*Acres*	*Acres*
Alabama	620, 740	10, 777	661	632, 178
Arizona	11, 334, 448		52, 604	11, 387, 052
Arkansas	2, 361, 477	81, 288	1, 686	2, 444, 451
California	19, 948, 614	23, 472	4, 696	19, 976, 782
Colorado	13, 728, 564	636, 343		14, 364, 907
Florida	1, 074, 589	114, 853		1, 189, 442
Georgia	666, 566	116, 653		783, 219
Idaho	20, 275, 378	49, 776		20, 325, 154
Illinois	210, 846			210, 846
Indiana	117, 063	3, 180		120, 243
Iowa	4, 749			4, 749
Kansas		106, 403		106, 403
Kentucky	457, 633			457, 633
Louisiana	560, 543	31, 155		591, 698
Maine	45, 862	465	3, 694	50, 021
Massachusetts			1, 651	1, 651
Michigan	2, 543, 067	7, 482		2, 550, 549
Minnesota	2, 734, 003			2, 734, 003
Mississippi	1, 047, 050	85, 627	1, 211	1, 133, 888
Missouri	1, 359, 490	12, 938		1, 372, 428
Montana	16, 634, 143	1, 935, 853		18, 569, 996
Nebraska	206, 082	133, 634		339, 716
Nevada	5, 057, 749			5, 057, 749
New Hampshire	677, 400			677, 400
New Mexico	8, 601, 548	740, 911	8, 840	9, 351, 299
New York		13, 747		13, 747
North Carolina	1, 122, 014	14, 037		1, 136, 051
North Dakota	520	1, 103, 475		1, 103, 995
Ohio	104, 966			104, 966
Oklahoma	181, 277	81, 269		262, 546
Oregon	14, 822, 958	105, 945		14, 928, 903
Pennsylvania	470, 268			470, 268
South Carolina	587, 234			587, 234
South Dakota	1, 119, 443	870, 343		1, 989, 786
Tennessee	587, 887	1, 212		589, 099
Texas	658, 015	124, 795		782, 810
Utah	7, 802, 131	53, 404	62, 666	7, 918, 201
Vermont	228, 518			228, 518
Virginia	1, 444, 588	2, 683		1, 447, 271
Washington	9, 688, 732			9, 688, 732
West Virginia	903, 558			903, 558
Wisconsin	1, 464, 923		17	1, 464, 940
Wyoming	8, 567, 188	573, 579		9, 140, 767
Alaska	20, 740, 612			20, 740, 612
Puerto Rico	33, 041	27		33, 068
Total	180, 795, 477	[1] 7, 035, 326	137, 726	187, 968, 529

[1] Consists of 125,479 acres administered by the Forest Service prior to January 2, 1954, and 6,909,847 acres transferred to the Forest Service on that date.

TABLE 2.—*Area of commercial timberland and volume of sawtimber and growing stock in the national forests, as of January 1, 1953*

State	Commercial forest land	Sawtimber volume	Growing stock volume [1]	State	Commercial forest land	Sawtimber volume	Growing stock volume [1]
	Thousand acres	*Million board-feet*	*Million cubic feet*		*Thousand acres*	*Million board-feet*	*Million cubic feet*
Alabama	614	1, 512	404	Nevada	30	87	38
Arizona	2, 201	14, 276	2, 727	New Hampshire	580	1, 661	751
Arkansas	2, 326	4, 655	1, 340	New Mexico	2, 993	8, 620	1, 990
California	8, 573	178, 913	32, 086	North Carolina	999	2, 566	708
Colorado	6, 262	22, 032	6, 570	Ohio	88	187	57
Florida	1, 035	1, 344	525	Oklahoma	180	380	95
Georgia	641	1, 577	464	Oregon	11, 435	196, 278	36, 825
Idaho	9, 174	63, 220	14, 284	Pennsylvania	454	445	245
Illinois	184	468	122	South Carolina	524	1, 400	472
Indiana	112	153	50	South Dakota	987	2, 641	1, 027
Iowa	3	1	1	Tennessee	566	1, 170	350
Kentucky	455	1, 420	380	Texas	655	2, 842	678
Louisiana	536	871	266	Utah	1, 865	5, 461	1, 407
Maine	51	110	49	Vermont	191	539	238
Maryland	4	8	--------	Virginia	1, 260	2, 292	781
Michigan	2, 343	2, 100	1, 119	Washington	5, 674	112, 629	22, 869
Minnesota	2, 195	2, 433	1, 367	West Virginia	881	1, 238	658
Mississippi	1, 036	2, 607	661	Wisconsin	1, 357	1, 119	713
Missouri	1, 339	1, 212	504	Wyoming	2, 542	9, 420	3, 150
Montana	8, 939	32, 954	9, 941				
Nebraska	30	10	48	Alaska	3, 445	82, 524	17, 139
				Total	84, 759	765, 375	163, 099

[1] Includes sawtimber volume.

TABLE 3.—*Volume and value of timber cut from the national forests, and area planted and seeded to trees, fiscal year 1956*

State	Timber Cut		Area planted and seeded to trees	
	Volume	Value	Fiscal Year 1956	Total through June 30, 1956
	Thousand board feet	*Dollars*	*Acres*	*Acres*
Alabama	60, 110	944, 058	680	45, 212
Arizona	211, 099	1, 763, 581	411	2, 765
Arkansas	132, 256	3, 548, 214	270	16, 227
California	1, 058, 081	18, 105, 120	4, 061	58, 108
Colorado	184, 913	707, 225	267	68, 507
Florida	77, 051	600, 716	2, 744	17, 340
Georgia	29, 364	595, 784	4, 382	10, 175
Idaho	613, 608	5, 334, 855	1, 128	103, 019
Illinois	3, 641	38, 542	1, 930	40, 030
Indiana	1, 588	17, 221	1, 504	17, 562
Kentucky	17, 779	223, 879	34	629
Louisiana	71, 186	794, 027	2, 337	102, 539
Maine	1, 035	8, 458		67
Michigan	103, 723	679, 228	4, 143	551, 783
Minnesota	113, 420	481, 572	2, 910	139, 459
Mississippi	119, 961	1, 881, 710	2, 128	144, 026
Missouri	33, 972	211, 015	825	66, 245
Montana	497, 827	3, 631, 429	1, 407	43, 454
Nebraska	4	44		29, 974
Nevada	697	12, 663	150	317
New Hampshire	9, 722	94, 943		1, 153
New Mexico	99, 315	925, 276	212	2, 609
New York	22	78		
North Carolina	55, 647	737, 254	1, 901	10, 163
North Dakota	62	570		
Ohio	2, 270	12, 991	1, 231	11, 773
Oklahoma	8, 729	128, 272		57
Oregon	1, 812, 361	34, 614, 063	13, 588	108, 293
Pennsylvania	12, 920	226, 590	258	17, 509
South Carolina	47, 441	1, 063, 005	282	18, 219
South Dakota	28, 133	191, 245	876	32, 419
Tennessee	22, 477	379, 088	390	5, 607
Texas	108, 132	2, 023, 454		49, 005
Utah	56, 293	367, 798	6	4, 020. 5
Vermont	9, 371	197, 872	2	1, 326
Virginia	32, 604	292, 694	183	4, 053
Washington	874, 489	15, 214, 115	9, 516	124, 273
West Virginia	28, 692	251, 872	42	15, 843
Wisconsin	66, 281	384, 310	1, 162	224, 552
Wyoming	81, 068	426, 160	202	7, 414
Alaska	219, 337	502, 356		
Puerto Rico	362	6, 201	9	12, 706
Total	6, 907, 043	[1] 97, 619, 548	61, 171	2, 108. 432. 5

[1] In addition, $9,453,610 was deposited in fiscal year 1956 for timber sold but not reported cut at time of this report, making total receipts $107,073,158.

TABLE 4.—*Number of livestock permitted to graze on the national forests, calendar year 1956*

State	Cattle and horses		Sheep and goats	
	Paid permits issued	Livestock	Paid permits issued	Livestock
	Number	*Number*	*Number*	*Number*
Alabama	1	948		
Arizona	921	149, 330	27	83, 563
Arkansas	146	2, 093		
California	1, 188	104, 461	80	105, 287
Colorado	1, 804	152, 479	464	543, 818
Florida	18	1, 779		
Georgia	16	195		
Idaho	1, 988	114, 048	375	584, 627
Illinois	18	114		
Indiana	3	11		
Iowa	6	141		
Louisiana	40	1, 076		
Michigan	68	905		26
Minnesota	36	418	1	18
Mississippi	132	1, 796		
Missouri	1, 131	5, 086		
Montana	1, 750	116, 509	136	205, 497
Nebraska	54	12, 031		
Nevada	256	53, 942	44	139, 010
New Mexico	1, 816	80, 011	138	85, 394
North Carolina	16	182		
Ohio	22	75		
Oklahoma	4	20		
Oregon	898	73, 758	102	133, 776
Pennsylvania	2	7		
South Carolina	42	847		
South Dakota	572	21, 831	18	12, 266
Tennessee	19	253		
Texas	160	1, 562		
Utah	2, 920	110, 122	586	455, 122
Vermont	9	100		
Virginia	10	128	3	106
Washington	450	21, 267	22	26, 239
West Virginia	80	988	32	915
Wisconsin	24	312	1	45
Wyoming	1, 008	106, 110	201	363, 001
Alaska				
Total	17, 628	1, 134, 935	2, 230	2, 738, 710

TABLE 5.—*Estimated number* [1] *of big-game animals on the national forests, as of April 30, 1956*

Region and State	Deer	Elk	Bear	Bighorn	Total big game [2]
	Number	*Number*	*Number*	*Number*	*Number*
Alabama	4, 300		2		4, 300
Arizona	103, 000	6, 600	1, 200	35	139, 000
Arkansas	22, 000	130	15		22, 000
California	604, 000	490	17, 000	660	626, 000
Colorado	261, 000	43, 000	8, 000	3, 100	316, 000
Florida	12, 000		260		12, 000
Georgia	6, 500		55		6, 600
Idaho	170, 000	67, 000	12, 000	2, 700	262, 000
Illinois	1, 100				1, 100
Indiana	680				680
Kentucky	1, 600		5		1, 600
Louisiana	2, 600				2, 600
Maine	500		20		520
Michigan	173, 000		4, 800		178, 000
Minnesota	59, 000		3, 700		64, 000
Mississippi	12, 000				12, 000
Missouri	34, 000		5		34, 000
Montana	216, 000	44, 000	8, 000	1, 400	280, 000
Nebraska	610				610
Nevada	104, 000	500	65	130	105, 000
New Hampshire	2, 100		420		2, 500
New Mexico	78, 000	2, 700	1, 400	60	85, 000
North Carolina	26, 000		750		27, 000
Ohio	1, 000				1, 000
Oklahoma	600				600
Oregon	242, 000	36, 000	8, 600		287, 000
Pennsylvania	42, 000		330		42, 000
South Carolina	4, 300		5		4, 300
South Dakota	63, 000	150			63, 000
Tennessee	5, 600		280		6, 700
Texas	6, 500				6, 500
Utah	252, 000	5, 200	460	15	258, 000
Vermont	12, 000		350		12, 000
Virginia	73, 000	120	1, 800		75, 000
Washington	100, 000	18, 000	14, 000		137, 000
West Virginia	26, 000		370		26, 000
Wisconsin	89, 000		1, 700		91, 000
Wyoming	66, 000	39, 000	2, 200	2, 400	115, 000
Alaska	69, 000	600	19, 000	1, 400	102, 000
Total	2, 950, 000	264, 000	106, 000	11, 000	3, 410, 000

[1] Figures rounded in posting and totals.
[2] Also includes antelope, moose, mountain goat, peccary, and wild boar.

TABLE 6.—*Construction, reconstruction, and maintenance of national-forest (forest development) roads, bridges, and trails, fiscal year 1956* [1]

State	Roads		Bridges, construction, reconstruction and replacement	Trails		Total obligations from all funds [2]
	Construction and reconstruction	Maintenance		Construction and reconstruction	Maintenance	
	Miles	*Miles*	*Number*	*Miles*	*Miles*	*Dollars*
Alabama	14.1	713.9	1			169,941
Arizona	14.2	5,732.9	16		3,680.1	555,033
Arkansas	5.5	2,703.6	7			455,522
California	41.8	13,389.9	36	2.0	16,513.1	6,396,108
Colorado	40.0	2,473.7	67	5.4	9,721.9	1,159,774
Florida	42.0	1,418.3	5			186,766
Georgia	8.9	666.8			182.9	276,679
Idaho	198.4	7,524.1	77	4.1	22,649.3	4,622,372
Illinois	0.7	138.2				85,737
Indiana		13.8				14,099
Kentucky	4.1	116.9	2		13.5	146,317
Louisiana	13.0	644.1	11			166,933
Maine		14.2			57.3	4,684
Michigan	6.8	1,345.3	11			421,537
Minnesota	13.3	976.0	9		453.3	728,981
Mississippi	8.4	777.7				233,327
Missouri	2.1	685.1	1			162,419
Montana	16.8	4,893.2	73	6.8	16,182.4	2,352,268
Nebraska		239.5				13,377
Nevada	9.0	1,137.2			1,763.0	111,043
New Hampshire	5.5	92.2	3	2.0	624.4	115,604
New Mexico	37.0	4,756.1	26	7.7	3,585.9	793,587
North Carolina	6.2	873.2	7		1,180.0	398,567
Ohio		1.6	5			−383
Oklahoma	2.0	177.8				26,535
Oregon	102.2	9,631.1	49	30.0	12,136.1	4,764,801
Pennsylvania	29.8	182.7			167.8	182,371
South Carolina	12.9	688.7	6			178,991
South Dakota	42.8	1,170.6	10		16.6	183,254
Tennessee	5.2	600.3	5		482.5	131,278
Texas	26.7	765.9	2			242,300
Utah	73.2	3,027.3	37	29.3	7,339.0	640,400
Vermont	1.3	82.9	4		161.0	80,325
Virginia	8.4	503.7	1		751.7	223,851
Washington	43.6	3,526.5	48	89.1	9,595.0	3,232,437
West Virginia	2.7	524.7	6		767.9	198,798
Wisconsin	4.8	945.0	5			322,132
Wyoming	54.0	1,897.3	16	1.0	5,867.7	897,826
Alaska	3.4	79.0			622.6	230,363
Puerto Rico	4.2	2.9			20.3	98,468
Total	905.0	75,133.9	546	177.4	114,535.3	31,204,422

[1] Total mileage of existing and planned national-forest (forest development) roads and trails as of June 30, 1956:

System:	*Roads (miles)*	*Trails (miles)*	*Total (miles)*
Existing	123,873	116,027	239,900
Planned	43,337	5,484	48,821
Total	167,210	121,511	288,721

[2] Includes Bureau of Public Roads obligations against advances made to them by the Forest Service, but excludes unobligated advances.

TABLE 7.—*Use of recreation resources on the national forests, calendar year 1956* [1]

State	Number of visits to—								
	Camp-grounds	Picnic areas	Winter sports areas	Organi-zation camps	Hotels or resorts	Recrea-tion resi-dences	Wilder-ness areas	Other forest areas	Total
Alabama		49, 950		3, 500				64, 350	117, 800
Arizona	360, 000	1, 000, 000	65, 000	16, 850	200, 000	35, 000	10, 000	815, 000	2, 501, 850
Arkansas	47, 080	243, 930		26, 755	7, 700			688, 214	1, 013, 679
California	1, 845, 010	1, 434, 627	945, 898	214, 581	626, 662	323, 270	154, 674	3, 320, 382	8, 865, 104
Colorado	889, 250	1, 945, 750	355, 550	28, 685	1, 164, 700	53, 670	21, 260	2, 017, 710	6, 476, 575
Florida	37, 400	342, 700		36, 100	900	8, 100		295, 000	720, 200
Georgia	48, 250	323, 000		2, 600	2, 500	3, 100		259, 000	638, 450
Idaho	353, 445	309, 705	175, 100	18, 915	88, 560	26, 287	18, 571	922, 955	1, 913, 538
Illinois	300	132, 000						180, 000	312, 300
Indiana	260	27, 000						61, 000	88, 260
Kentucky	16, 000	121, 000		580	23, 000	2, 000		269, 000	431, 580
Louisiana		31, 000				6, 500		69, 000	106, 500
Maine		8, 000			350			20, 000	28, 350
Michigan	71, 300	211, 200	131, 000	10, 240	4, 400	22, 600		1, 652, 000	2, 102, 740
Minnesota	85, 000	75, 000	3, 700	7, 600	75, 000	19, 000	85, 000	587, 000	937, 300
Mississippi	3, 000	72, 000		3, 000				306, 465	384, 465
Missouri	8, 500	46, 900		900	300	400		743, 500	800, 500
Montana	192, 991	295, 284	84, 940	22, 450	45, 820	65, 582	17, 385	742, 840	1, 467, 292
Nebraska		23, 100		1, 000				8, 226	32, 326
Nevada	82, 130	109, 200	44, 100	6, 080		730		95, 000	337, 240
New Hampshire	51, 000	159, 000	89, 000	200	45, 000			753, 000	1, 097, 200
New Mexico	184, 000	669, 000	30, 000	15, 000	8, 000	6, 000	10, 000	771, 000	1, 693, 000
North Carolina	339, 000	759, 000		12, 000	36, 000	1, 500	33, 000	1, 010, 000	2, 190, 500
Ohio	5, 500	53, 000						81, 000	139, 500
Oklahoma	2, 400	20, 000						13, 200	35, 600
Oregon	847, 000	793, 250	387, 050	52, 995	1, 451, 000	47, 385	22, 650	823, 600	4, 424, 930
Pennsylvania	6, 000	73, 000		2, 500		10, 000		633, 000	724, 500
South Carolina	200	185, 780						77, 950	263, 930
South Dakota	166, 300	762, 350		8, 100	7, 100	17, 000		736, 200	1, 697, 050
Tennessee	33, 000	502, 000		22, 000	59, 000	27, 000		525, 000	1, 168, 000
Texas	6, 000	101, 000		2, 000				96, 000	205, 000
Utah	505, 750	2, 299, 400	319, 150	89, 975	52, 720	56, 720	20, 000	747, 940	4, 091, 655
Vermont	1, 800	42, 000	25, 000					22, 000	90, 800
Virginia	12, 900	200, 000		6, 700		230		467, 000	686, 830
Washington	622, 500	632, 000	308, 150	60, 210	127, 350	57, 450	6, 870	441, 000	2, 255, 530
West Virginia	12, 950	82, 900		3, 950				363, 800	463, 600
Wisconsin	26, 200	106, 200	12, 600	1, 070	150	1, 680		239, 000	386, 900
Wyoming	287, 970	259, 500	55, 150	23, 670	70, 150	36, 500	48, 930	467, 320	1, 249, 190
Alaska	54, 600	65, 700	9, 125	955	2, 550	13, 270		119, 000	265, 200
Puerto Rico		100, 800		6, 820	30, 000	10, 500		3, 000	151, 120
Total	7, 204, 986	14, 667, 226	3, 040, 513	707, 981	4, 128, 912	851, 474	448, 340	21, 506, 652	[2] 52,556,084

[1] In addition to the 52,556,084 visits to national-forest recreation areas, some 131 million visitors traveled highways and roads through the national forests in order to enjoy the natural forest environment, the scenery, and the climatic relief which the forests provide.

[2] For breakdown of primary purpose of visits, see tabulation in national-forest recreation section.

TABLE 8.—*Fires controlled by national-forest fire organizations to protect national-forest lands, and area burned, calendar year 1956*

State	Fires						Area burned	
	Lightning	Campfire	Smoker	Incendiary	Other causes	Total [1]	National forest	Other ownership
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Acres*	*Acres*
Alabama	16	5	53	36	54	164	755	2, 045
Arizona	1, 371	73	104	9	81	1, 638	76, 214	86, 330
Arkansas	140	22	50	41	56	309	1, 297	1, 905
California	1, 533	58	202	64	274	2, 131	49, 495	73, 071
Colorado	205	102	90	5	57	459	1, 946	2, 441
Florida	98	5	53	24	57	237	39, 624	40, 786
Georgia	2	5	15	7	23	52	161	252
Idaho	731	34	50	2	40	857	3, 225	4, 081
Illinois		6	20	9	46	81	721	1, 395
Indiana			4		12	16	79	328
Kentucky	2	3	15	7	47	74	314	458
Louisiana	16	1	34	53	22	126	696	1, 162
Michigan	2	10	25	3	37	77	26	131
Minnesota	12	18	18	4	25	77	220	659
Mississippi	11	14	92	165	85	367	2, 452	3, 086
Missouri	18	10	70	151	178	427	2, 845	4, 285
Montana	570	33	48		63	714	2, 214	3, 330
Nebraska	15					15	460	581
Nevada	16	1	12		4	33	783	789
New Hampshire					3	3	0	0
New Mexico	1, 025	56	65	3	39	1, 188	13, 187	14, 957
North Carolina	10	11	28	39	36	124	1, 106	1, 594
Ohio			17	9	30	56	140	233
Oklahoma	14	4	1	1	15	35	93	138
Oregon	1, 082	115	90	1	109	1, 397	963	1, 102
Pennsylvania			1		1	2	0	0
South Carolina	6	4	43	79	42	174	3, 250	4, 130
South Dakota	114	5	8		28	155	22	46
Tennessee	7	1	20	50	22	100	574	736
Texas	16	24	109	35	74	258	1, 053	1, 458
Utah	133	64	37	1	23	258	681	1, 615
Vermont					1	1	0	0
Virginia	9	1	34	20	44	108	741	1, 063
Washington	338	40	26		42	446	496	590
West Virginia		1	6	2	20	29	447	502
Wisconsin	1	5	5	1	16	28	9	42
Wyoming	156	36	32	2	10	236	2 140	2, 447
Alaska		6	1		7	14	0	3
Total	7, 669	773	1, 478	823	1, 723	12, 466	208, 429	257, 771

[1] Includes 9,457 fires on national-forest land and 3,009 on lands in other ownerships within and adjacent to the national forests.

TABLE 9.—*Forest fires on protected State and private lands, and area burned, calendar year 1956; and expenditures for control, fiscal year 1956* [1]

(CLARKE-MCNARY LAW, SEC. 2)

State	Area protected	Fires	Area burned	Prevention and suppression expenditures			
				Federal	State and county	Private [2]	Total
	Thousand acres	*Number*	*Acres*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Alabama	19, 990	6, 281	145, 032	362, 259	706, 104	114, 717	1, 183, 080
Arkansas	16, 716	4, 260	59, 225	285, 043	733, 559	81, 444	1, 100, 046
California	19, 500	2, 127	87, 868	1, 373, 806	6, 702, 912		8, 076, 718
Colorado	7, 404	337	7, 222	26, 492	50, 635	40, 419	117, 546
Connecticut	1, 907	363	1, 504	48, 393	109, 197		157, 590
Delaware	440	61	121	9, 400	10, 464		19, 864
Florida	15, 043	7, 399	271, 041	582, 025	1, 960, 118	174, 382	2, 716, 525
Georgia	21, 515	7, 693	114, 141	586, 130	2, 194, 986	50, 927	2, 832, 043
Idaho	6, 963	471	5, 874	142, 007	183, 478	116, 109	441, 594
Illinois	3, 755	431	18, 108	26, 622	117, 897		144, 519
Indiana	4, 255	313	5, 752		173, 845		173, 845
Iowa	1, 968	27	473	25, 000	27, 223		52, 223
Kentucky	7, 096	1, 706	60, 740	101, 648	305, 513		407, 161
Louisiana	11, 751	7, 145	130, 419	307, 016	1, 243, 173	6, 761	1, 556, 950
Maine	16, 692	443	2, 580	225, 510	632, 876		858, 386
Maryland	2, 686	376	800	105, 786	363, 634		469, 420
Massachusetts	3, 293	3, 566	5, 311	108, 941	365, 720		474, 661
Michigan	17, 124	761	3, 529	447, 319	1, 855, 819		2, 303, 138
Minnesota	17, 996	921	24, 327	310, 296	572, 260		882, 556
Mississippi	12, 213	7, 573	122, 557	301, 951	659, 712	276, 633	1, 238, 296
Missouri	8, 566	2, 715	82, 834	203, 925	547, 989		751, 914
Montana	6, 000	268	1, 103	80, 572	94, 456	132, 001	307, 029
Nevada	2, 150	49	2, 927	25, 500	59, 160		84, 660
New Hampshire	4, 176	496	751	65, 816	154, 788	6, 894	227, 498
New Jersey	2, 294	885	4, 067	92, 106	293, 607		385, 713
New Mexico	1, 360	217	5, 313	17, 608	19, 633		37, 241
New York	13, 423	943	5, 275	247, 395	719, 113		966, 508
North Carolina	15, 652	3, 039	86, 944	321, 961	888, 839	35, 213	1, 246, 013
North Dakota	375	49	3, 994	1, 662	1, 662		3, 324
Ohio	4, 973	650	4, 421	75, 413	213, 061		288, 474
Oklahoma	3, 591	1, 425	44, 996	82, 049	189, 636	20, 083	291, 768
Oregon	11, 995	965	12, 191	615, 679	1, 522, 521	660, 066	2, 798, 266
Pennsylvania	14, 659	560	7, 681	189, 606	765, 410		955, 016
Rhode Island	452	124	627	25, 500	123, 817		149, 317
South Carolina	11, 300	4, 869	81, 538	271, 395	933, 743		1, 205, 138
South Dakota	896	50	91	25, 000	35, 175		60, 175
Tennessee	9, 580	3, 483	38, 876	214, 867	608, 671	3, 086	826, 624
Texas	9, 268	4, 727	76, 797	223, 731	433, 450	139, 256	796, 437
Utah	5, 721	152	4, 459	25, 500	64, 452		89, 952
Vermont	3, 504	116	414	25, 500	48, 748		74, 248
Virginia	12, 971	1, 417	9, 019	221, 845	653, 142	4, 581	879, 568
Washington	12, 329	1, 224	1, 760	563, 860	1, 810, 528	409, 032	2, 783, 420
West Virginia	9, 038	1, 242	64, 705	140, 431	233, 491		373, 922
Wisconsin	15, 590	1, 074	5, 409	347, 668	1, 242, 509		1, 590, 177
Hawaii	1, 221	4	6	4, 500	10, 158		14, 658
Total	[3] 389, 391	82, 997	1, 612, 822	9, 484, 733	30, 636, 884	2, 271, 604	42, 393, 221

[1] Data incomplete for Arizona and Nebraska.
[2] Private expenditures, spent under direct supervision of State Forester, as part of the Clarke-McNary program.
[3] In addition, 533,000 acres in Wyoming are protected. Other data for the State are incomplete.

TABLE 10.—*Distribution of forest planting stock, and expenditures by cooperating States, fiscal year 1956*

State	Seedlings and transplants shipped	Expenditures			
		Federal funds	State appropriated funds	Receipts from sale of stock used in program	Total
	Thousands	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Alabama	35, 998	11, 700	69, 552	86, 885	168, 137
Arkansas	15, 354	11, 000	16, 310	50, 950	78, 260
California	891	10, 900	31, 754	15, 348	58, 002
Colorado [1]	329	2, 798	2, 798	11, 665	17, 261
Connecticut	497	12, 045	28, 159	8, 899	49, 103
Delaware	415	2, 500	8, 685	600	11, 785
Florida	54, 077	12, 450	125, 930	214, 595	352, 975
Georgia	112, 833	12, 800	84, 488	341, 874	439, 162
Idaho	375	8, 119	8, 119	6, 637	22, 875
Illinois	6, 622	12, 900	29, 697	71, 322	113, 919
Indiana	6, 409	0	57, 974	133, 040	191, 014
Iowa	1, 060	0	0	39, 080	39, 080
Kentucky	6, 272	11, 200	61, 361	44, 386	116, 947
Louisiana	42, 453	11, 800	41, 843	126, 411	180, 054
Maine	1, 130	5, 150	5, 226	14, 499	24, 875
Maryland	3, 526	11, 200	21, 809	2, 437	35, 446
Massachusetts	580	11, 200	23, 413	14, 554	49, 167
Michigan	4, 604	10, 900	11, 886	53, 879	76, 665
Minnesota	13, 630	12, 900	52, 518	19, 264	84, 682
Mississippi	30, 657	11, 800	74, 171	86, 360	172, 331
Missouri	2, 336	12, 900	13, 187	17, 614	43, 701
Montana	400	11, 000	11, 404	18, 255	40, 659
Nebraska [1]	1, 187	1, 304	1, 304	40, 237	42, 845
New Hampshire	1, 072	11, 200	23, 065	7, 015	41, 280
New Jersey	1, 234	10, 013	10, 013	10, 984	31, 010
New York	29, 153	11, 200	214, 689	49, 928	275, 817
North Carolina	32, 182	12, 450	82, 430	109, 597	204, 477
North Dakota	615	10, 900	11, 117	14, 050	36, 067
Ohio	10, 034	13, 260	119, 855	101, 303	234, 418
Oklahoma	1, 271	11, 000	20, 056	9, 215	40, 271
Oregon	6, 675	4, 350	10, 972	57, 402	72, 724
Pennsylvania	12, 014	11, 200	83, 994	73, 992	169, 186
Rhode Island	146	4, 000	5, 644	28	9, 672
South Carolina	32, 614	11, 500	25, 659	78, 289	115, 448
South Dakota	2, 210	8, 958	8, 958	64, 621	82, 537
Tennessee	22, 202	11, 000	11, 023	68, 504	90, 527
Texas	17, 617	11, 500	86, 832	62, 261	160, 593
Utah	167	2, 913	2, 914	3, 355	9, 182
Vermont	2, 131	11, 200	40, 103	13, 313	64, 616
Virginia	19, 960	10, 000	19, 486	87, 431	116, 917
Washington	450	9, 050	10, 586	6, 324	25, 960
West Virginia	3, 126	9, 615	9, 615	34, 061	53, 291
Wisconsin	22, 825	13, 440	208, 236	213, 163	434, 839
Wyoming	239	2, 320	2, 321	5, 785	10, 426
Hawaii	186	10, 900	32, 539	----------	43, 439
Puerto Rico [1]	698	8, 000	30, 000	----------	38, 000
Total	560, 456	428, 535	1, 851, 695	2, 489, 412	4, 769, 642

[1] Estimates.

TABLE 11.—*Cooperative forest management accomplishments and expenditures, fiscal year 1956* [1]

State	Accomplishments				Expenditures		
	Woodland owners assisted	Woodland involved	Products harvested	Gross sale value	Federal	State	Total
	Number	*Acres*	*Thousand board-feet*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Alabama	118	19, 630	3, 939	94, 679	5, 910	6, 703	12, 613
Arkansas	228	42, 985	7, 467	134, 884	11, 350	22, 604	33, 954
California	776	. 95, 215	55, 156	535, 904	8, 391	50, 444	58, 835
Connecticut	584	18, 276	1, 831	25, 879	10, 600	21, 352	31, 952
Delaware	78	4, 014	727	67, 516	2, 490	2, 722	5, 212
Florida	1, 675	1, 085, 821	28, 022	712, 690	20, 697	85, 083	105, 780
Georgia	1, 123	185, 913	22, 789	563, 872	19, 190	62, 957	82, 147
Idaho	62	5, 726	258	5, 350	1, 992	1, 992	3, 984
Illinois	793	23, 510	10, 574	189, 728	23, 659	39, 385	63, 044
Indiana	252	10, 329	3, 601	92, 956			
Iowa	422	16, 494	1, 921	46, 467	7, 083	17, 723	24, 806
Kentucky	449	23, 088	3, 273	78, 682	17, 909	36, 253	54, 162
Louisiana	220	27, 589	3, 084	76, 342	13, 175	23, 323	36, 498
Maine	2, 337	55, 485	20, 091	382, 047	21, 800	46, 713	68, 513
Maryland	1, 726	30, 341	8, 933	198, 954	20, 400	45, 763	66, 163
Massachusetts	280	9, 519	6, 075	87, 316	5, 500	7, 614	13, 114
Michigan	893	16, 776	10, 889	281, 964	19, 037	51, 910	70, 947
Minnesota	603	10, 001	3, 649	82, 423	11, 745	17, 365	29, 110
Mississippi	575	61, 885	10, 996	306, 829	13, 175	20, 648	33, 823
Missouri	1, 376	170, 466	10, 280	337, 985	25, 566	53, 269	78, 835
Montana	13	11, 746	160	800	6, 500	6, 719	13, 219
New Hampshire	1, 373	68, 069	16, 094	342, 156	19, 200	29, 750	48, 950
New Jersey	578	34, 982	10, 205	164, 095	12, 700	34, 391	47, 091
New York	4, 136	254, 956	45, 866	1, 181, 525	20, 100	156, 493	176, 593
North Carolina	854	70, 807	17, 410	472, 994	24, 195	35, 872	60, 067
North Dakota	55	718	184	11, 776	2, 750	3, 989	6, 739
Ohio	1, 423	38, 519	6, 687	221, 172	15, 552	78, 518	94, 070
Oklahoma	361	1, 130	69	3, 105	5, 245	5, 245	10, 490
Oregon	931	46, 177	55, 622	1, 532, 634	9, 312	20, 378	29, 690
Pennsylvania	696	22, 227	1, 411	36, 223	20, 000	24, 486	44, 486
Rhode Island	114	16, 185	184	2, 803	2, 450	4, 154	6, 604
South Carolina	1, 251	149, 927	16, 524	451, 408	17, 520	42, 430	59, 950
South Dakota	178	2, 765			2, 623	2, 623	5, 246
Tennessee	671	51, 470	14, 552	395, 843	16, 500	17, 347	33, 847
Texas	719	51, 353	4, 044	74, 742	13, 350	17, 548	30, 898
Utah					2, 639	2, 640	5, 279
Vermont	2, 725	70, 295	17, 212	502, 165	30, 400	68, 308	98, 708
Virginia	3, 268	194, 821	171, 592	4, 115, 630	33, 100	111, 664	144, 764
Washington	897	43, 747	19, 054	562, 938	12, 550	24, 482	37, 032
West Virginia	472	6, 989	4, 712	58, 834	17, 854	17, 854	35, 708
Wisconsin	2, 836	74, 798	10, 455	324, 245	27, 391	113, 485	140, 876
Total	38, 121	3, 124, 744	625, 592	14, 757, 555	571, 600	1, 432, 199	2, 003, 799

[1] Performed under authority of Cooperative Forest Management Act of Aug. 25, 1950.

TABLE 12.—*Pest control, calendar year 1956*

INSECT AND DISEASE (EXCLUDING BLISTER RUST) CONTROL [1]

Ownership	Bark beetles, trees treated	Defoliators,[2] area treated	Miscellaneous insects and diseases,[3] area treated
	Number	*Acres*	*Acres*
National forest and other Federal lands	304, 792	1, 366, 900	98, 900
State and private lands	8, 778	134, 155	1, 628
Total	313, 570	1. 501, 055	100, 528

BLISTER RUST CONTROL

Ownership	New work	Rework	Maintenance work	Total treated	Ribes destroyed
	Acres	*Acres*	*Acres*	*Acres*	*Number*
National forests	23, 033	73, 050	17, 591	113, 674	4, 870, 487
Interior lands	5, 899	24, 937	9, 541	40, 377	992, 399
State and private	123, 310	392, 551	52, 439	568, 300	7, 809, 389
Total	152, 242	490, 538	79, 571	722, 351	13, 672, 275

[1] Under provisions of Forest Pest Control Act of 1947.
[2] Defoliators include spruce budworm, tussock moth, hemlock looper, and others.
[3] Includes cone and seed insects, hardwood borers, weevils, sawflies, Saratoga spittlebugs, pine tip moths, oak wilt, dwarf mistletoe, and miscellaneous insects and diseases.

TABLE 13.—*Statement of Forest Service receipts and expenditures for national-forest programs and land utilization projects, fiscal year 1956* [1]

Item	Receipts	Expenditures	
		Operating	Investments
National-forest protection and management and land utilization projects		$34,172,615	$3,593,372
Fighting forest fires		12,417,974	
Blister rust control		1,668,475	13,179
Forest pest control		3,130,391	7,635
Cooperative range improvements		388,945	296,878
Smokejumper facilities			2,722
Road and trail system—construction and maintenance		9,185,353	22,090,928
Acquisition of land		6,889	402,316
Flood prevention and watershed protection		422,929	450,460
Cooperative deposits (including timber deposits for stand improvement)	[2] $7,919,080	700,551	5,454,625
National forest and L. U. area receipts:			
Forest reserve fund	111,739,132		
Oregon and California lands (National forest)	2,485,782		
Tongass National Forest, Alaska (escrow account)	568,184		
Land utilization areas (Title 3, Farm Tenant Act)	2,204,059		
Other miscellaneous receipts	808,704		
Total	125,724,941	62,094,122	32,312,115
Less cooperative deposits investment receipts	7,207,620		
Total operating receipts and expenditures	118,517,321	$94,406,237	

[1] Receipts		$118,517,321
Operating expenditures	$62,094,122	
Estimated annual depreciation on roads, trails, and other improvements in place on June 30, 1955	17,192,000	
Total		79,286,122
Amount by which receipts exceed operating expenditures plus estimated depreciation		39,231,199
[2] Operating	711,460	
Investment	7,207,620	
Total		7,919,080

TABLE 14.—*Statement of Forest Service receipts and expenditures from all sources, fiscal year 1956*

Item	Receipts	Expenditures
National-forest programs	[1] $125,724,941	$94,406,237
Research programs:		
Forest research		8,166,323
Cooperative deposits	688,810	[2] 732,299
Total	688,810	8,898,622
State and private forestry programs:		
Cooperation with States		11,370,926
Forest pest control		126,362
Blister rust control		634,360
Flood prevention and watershed protection		972,594
Forest fire prevention—Smokey Bear	19,955	[2] 31,080
Cooperative deposits	1,462,777	1,452,432
Total	1,482,732	14,587,754
Work for others:		
Forest pest control		[3] 152,876
Blister rust control		[3] 417,052
Cooperative deposits	1,491,319	1,315,506
Brush disposal	3,446,847	3,287,641
Other services (funds advanced, or reimbursed, by others)	[4] 4,429,483	[2] 4,539,596
Total	9,367,649	9,712,671
Total	137,264,132	127,605,284
Portion of receipts distributed to States, territories, and counties as directed by Congress:		
Forest reserve fund (Act 5/23/08)		27,893,210
Arizona and New Mexico school fund (Act 6/20/10)		129,404
Tongass National Forest, Alaska (Act 7/24/56)		[5] 142,046
State of Minnesota (Superior National Forest) (Act 6/22/48)		46,497
Title 3, farm tenant land (Act 7/22/37)		[6] 459,795
Total		28,670,952
Grand total		156,276,236

[1] Excludes receipts for power licenses and mineral leases received by other agencies estimated at $1,825,000.
[2] Includes expenditures from prior year funds.
[3] Includes $117,800 pest control and $355,000 blister rust control made available in FS appropriations for Interior Department.
[4] Does not include transfers of allotment in the amount of $116,000.
[5] In addition to above, payment of 25 percent of receipts collected for fiscal years 1948 through 1955 ($455,087) was made to Alaska in FY 1957 pursuant to Act of 7/24/56.
[6] Covers distribution against calendar year 1955 receipts.

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